SEPTEMBER, 1956

American Engineer

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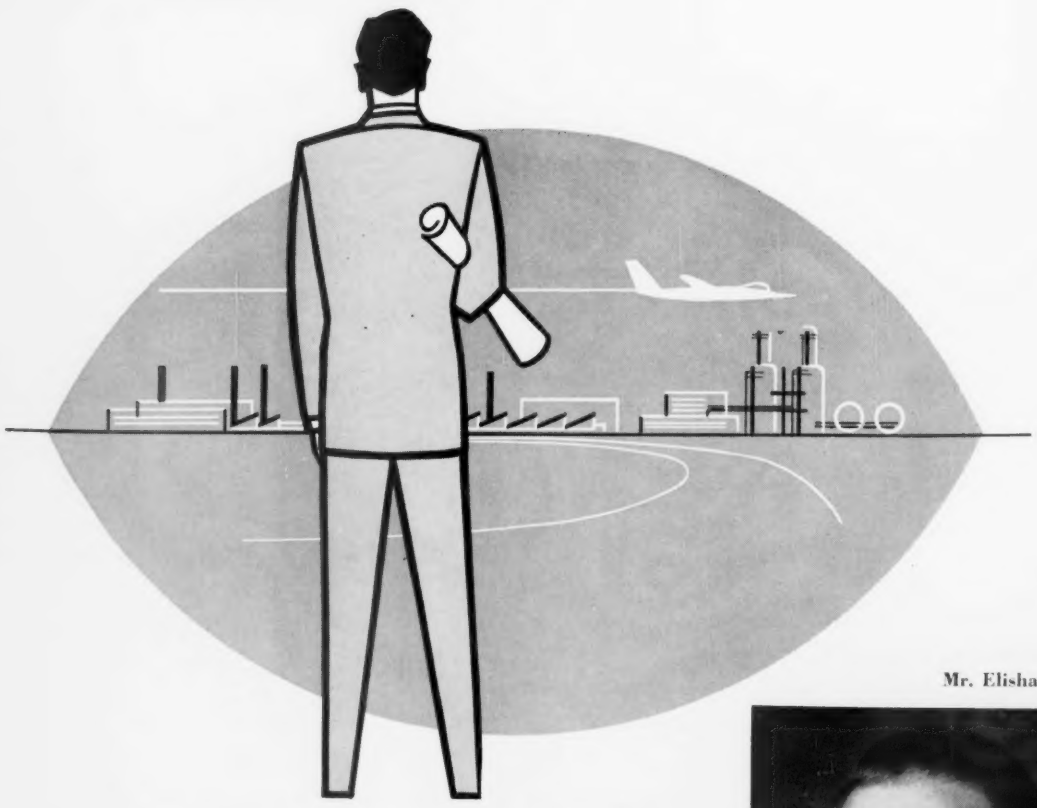
- **Primary Job Consideration: Professional Opportunity**

By

Elisha Gray II, President, Whirlpool-Seeger Corporation



Mr. Elisha Gray II

The "Wisconsin Idea" About Gifted Students by Prof. Clyde M. Brown

The Engineer at the National Bureau of Standards by Dr. Allen V. Astin

***A Symposium:* Management-Professional Employee Relations *Plus* Fall Board Meeting and National Engineers' Week News**

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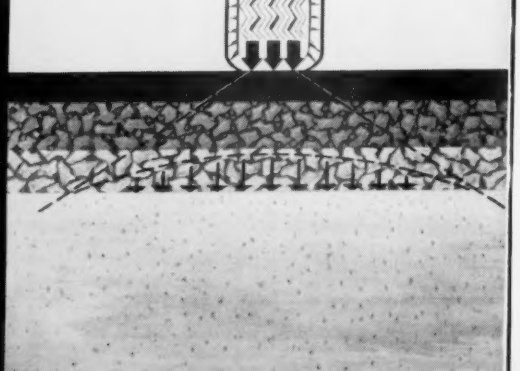
Savings pay maintenance

Table below reports Oklahoma's saving on paving Turner Turnpike with Asphalt. It's enough for 65 years maintenance at today's prices.

Capacity easily upped

Many states are planning to modernize in easy stages with Asphaltic concrete . . . adding lanes and extra strength as need develops. They're also renewing older roads with minimum traffic interruption and cost.



BID PRICES BY CONTRACT SECTIONS
THE TURNER TURNPIKE—
OKLAHOMA CITY TO TULSA

(Awards by the Oklahoma Turnpike Authority)

CONTRACT NUMBER	MILES	ASPHALT	ASPHALT SAVING
#34	4.53	$ 491,636	$ 57,529
#39	5.93	615,131	96,241
#40 (A&B)	7.98	941,343	94,070
#41	5.65	608,269	99,545
#42	3.38	351,115	58,098
#31	7.83	883,098	105,545
#32	8.04	902,231	112,027
#37	4.94	548,641	67,563
#38	7.61	848,181	110,956
#17	9.03	957,213	136,890
#18 (A&B)	9.05	1,097,599	131,979
#33	8.61	1,046,907	90,677
TOTAL	82.58	$9,291,364	$1,161,120

The Turner Turnpike was designed to carry axle loads of 28,800 Pounds

JR pavement on interstate highways

The talk is over. Next step is building your State's sections of the Interstate Highway System.

Question now is *which* paving? Which meets the engineering requirements with the greatest economy?

The facts favor Asphaltic concrete.

Take engineering requirements. Findings on the WASHO Road Test show that standard Asphaltic concrete designs provide all-weather roads able to carry the heaviest legal truck axle loads, AND MORE!

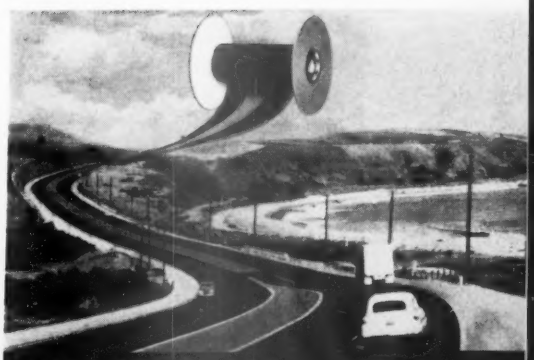
Photo shows why. Asphaltic concrete *spreads* wheel loads, has built-in resilience to take traffic pounding. It withstands temperature changes, conforms to settlements without fracturing. It repels moisture, melts off ice and snow more quickly, isn't harmed by winter-time use of chemicals.

Take first cost. Here are figures showing Asphalt savings based on actual competitive bids. New Jersey Turnpike (118 miles) $5.457.134 saved. Oklahoma Turnpike (83 miles) —see table at left—$1.161.120 saved. Savings like these pay for years of maintenance . . . or allow more and wider road for the money.

Take maintenance. It's always low with Asphaltic concrete. It's easier too, and much faster.

And when future loads and traffic volume increase as they inevitably will, just add another course of Asphaltic concrete. This builds up thickness and strength.

Plan for Asphaltic construction. You'll have smooth going . . . during construction . . . on the road . . . with the taxpayers.



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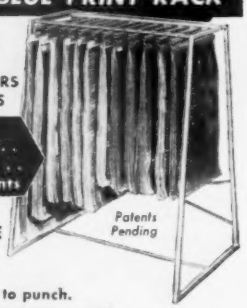

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Letters to the Editor

Engineers as Speakers . . .

Dear Editor:

Engineers, in popular conception, are mute, inarticulate, and non-vocal. For many years I have conducted a one-man campaign to correct this impression.

Every professional man needs the art of effective speaking—to sell his services, his product, and his profession. His advancement, his leadership, and his prestige depend largely on his powers of presentation, persuasion, and inspiration.

Effective speaking, to small groups or to larger audiences, is simple, direct, purposeful. The fundamental rule is to have something to say and to say it.

Good speaking needs good ideas and complete preparation. Even for impromptu talks, on short notice, the speaker has a few minutes to organize his thoughts, to plan his sequence, and to prepare his opening and closing sentences for effectiveness. The opening sentences should be planned to enlist the friendship and the attention of the audience, and the closing sentences should be designed as a climax, to clinch the objective and to leave the desired lasting impression. This ability comes with practice.

The best address is wasted if it is not attuned to the audience in both interest and clarity. The speaker must make sure that he is applying his presentation to the interests and emotions of his audience, and that, by clarity and enunciation, every word is reaching his audience. Otherwise the effort is wasted. The favorable response of the listeners is both the objective and the reward.

DR. D. B. STEINMAN, P.E.,
New York, N. Y.

► See the "NSPE Believes" feature in the July issue.—*Editor.*

Correction . . .

Dear Editor:

Did I say "Professional *Trades*" (in my letter to you published in the July issue)? It's hard to believe. It adds insult to injury. NSPE has saved the engineering profession from being a trade. It should be "Professional *Grades*." Please correct.

KENNETH M. ADELSTEIN, P.E.,
Yorktown, Va.

► Sorry, our mistake. Engineer Adelstein did indeed say "Grades" and not "Trades."—*Editor.*

Engineers in Government . . .

Dear Editor:

The Symposium, "Professional Status of the Engineer in Government," which appeared in the July issue is the best series on this subject that I have ever read. As a member of the government "fold" at the city level I can say "amen" to many of the points made.

Naturally many of my professional friends also work for the government either at the Federal, state or local level and I can honestly say that I don't know what keeps so many good men in these jobs. Certainly it is not money! I suppose many feel as I do that the satisfaction in doing worthwhile and often important work makes up for the lack of high salaries.

(Name and address withheld by request.)

Utilization in Government . . .

Dear Editor:

I was agreeably surprised to read in the August issue of the AMERICAN ENGINEER of the request of Rep. James C. Davis of Georgia for an investigation of the utilization of engineers and scientists in government and cost-plus defense industries. It is about time the facts concerning the vast waste of engineering manpower in those fields be revealed.

I have in the past personally witnessed the situation which is very harmful not only to the morale of creative people but to all tax paying Americans. Representative Davis is to be warmly applauded.

(Name withheld by request)
Hyattsville, Md.

Engineers' Aides? . . .

Dear Editor:

There has been much discussion in the press and elsewhere on the subject of the shortage of engineers, but why not have helpers to relieve engineers of time-consuming extra duties?

I first read of this idea recently in connection with the nurse and school teacher shortages, and it struck me as furnishing a smart, practical way to lick the growing shortage of engineers which, together with our growing demand for highly trained technical personnel, is one of our major, most immediate national problems.

In brief it is this: hire competent engineers' aides, or non-professional assistants who know how to assist engineers and preferably having some desire to become engineers, to assist the regular licensed engineers by relieving them of time-consuming, non-professional duties.

Give them work which requires mostly patience and common sense, in much the same way that nurses' aides have taken over many of the chores that registered nurses used to perform in hospitals.

The use of nurses' aides has been so successful—in fact so necessary and unavoidable in these days of crowded hospitals and shortages of nurses—that the use of engineers' aides ought to be just as successful.

In the case of teachers, under a grant from the Ford Foundation a stopwatch survey was made of 137 teachers in Michigan to see how their time was consumed. The survey found that twenty-six per cent of a teacher's time (not counting overtime outside the classroom) was spent in non-teaching chores. After a year's experiment with aides the teachers reported they could handle fifty per cent more pupils, the parents felt their children had learned more, and the kids reported they had enjoyed school more. Further time-studies confirmed that the teachers were putting in a fourth more time teaching, instead of nose-wiping and fund-collecting.

Another interesting result: after a year of service as aides, several were so fascinated that they put in for extension courses to qualify as teachers themselves.

In these days of abounding engineering activities, which is going to increase astoundingly in the next ten years, why doesn't this plan make sense? Are there any engineering organizations, industries or government agencies trying it or willing to try it?

RAYMOND J. ROSENBERGER, P.E.,
Cleveland, O.

American Engineer

SEPTEMBER

1956

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"My observation . . . is that the engineer feels his professional responsibility to mankind just as much as does the physician and the military man. He does not (always) take an oath as they do, but his sense of professional responsibility is as deep in his heart as any oath could make it."

—R. E. Gillmor,
Retired Vice Pres.,
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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Standards Engineers Society Meet In Oct.

Today's technological problems will be surveyed and possible solutions through application of standards will be considered at the fifth annual meeting of the Standards Engineers Society, October 3-5, in Washington, D. C. Theme of the meeting is "Standards—Guides for Tomorrow."

Sessions are scheduled on standardization in the chemical industry, standards and the atomic energy field, the future trend of standards in the metals field, creative engineering and standards, progress of engine standardization, and what may be expected in the ABC unification effort.

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Traineeship Program Authorized for PHS

The Public Health Service has been authorized to establish a program of traineeships for graduate public health training of professional health personnel as result of the Health Amendment Act passed by Congress in July.

The public health traineeship provisions of the Act are designed to supplement — not replace — the training activities currently being supported by state and local health agencies.

With respect to provision of training for engineers under this program, only graduate or specialized public health training will be provided—not basic professional preparation. Information regarding availability of traineeships for engineers, and regarding stipends, allowances, submission of applications, etc., are available from the Chief, Division of General Health Service, Public Health Service, Washington, D. C.

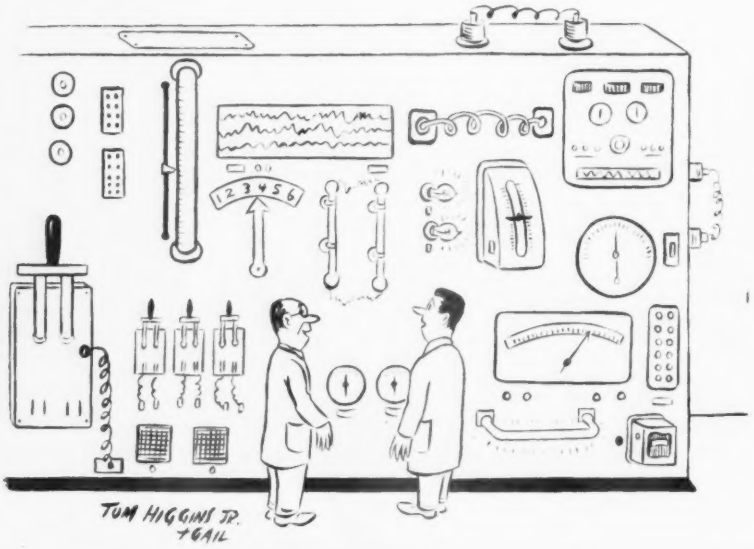
Committee Organized To Aid Cooper Union

A committee of more than one hundred persons has been organized to sponsor a three-year development program for Cooper Union.

The group, when completed, will have a membership of two hundred and will be called the Cooper Union Centennial Committee. It will consult with the institute's administration on a program of educational development leading to the institute's one hundredth birthday celebration in 1959.

Jose B. Calva Elected Fellow In Association

The American Association for the Advancement of Science has recently announced that Jose B. Calva, a member of NSPE, has been elected a Fellow of the Association. Mr. Calva is president and technical director of J. B. Calva and Co., a consulting and research engineering organization.



"I'll work with you for a few minutes until you get the hang of it."

Soviets Graduate Twice U.S. Total In Science Field, But Systems Vary

More than twice as many students in science fields were graduated in the Soviet Union in 1955 than were graduated in the United States, according to figures made public recently by the National Science Foundation. Soviet field graduates in the Soviet Union totalled 126,000, of which 59,000 graduates were in engineering. In the United States, the total was 59,000 science field graduates, of which 22,589 were in engineering.

Dr. Alan T. Waterman, Foundation director, said the figures should be viewed "with caution." American and Soviet scientists, he explained, "live in vastly different social, political and economic frameworks." Moreover, he said, the educational systems in the two countries were not comparable.

The estimates showed that the United States had 1,536,000 scientists with degrees in natural science, psychology, agriculture and engineering. This is 378,000 more than the 1,158,000 Soviet scientists with about the same degrees, the Foundation said.

The Foundation, which was created by Congress in 1950, said it had obtained most of its data on Soviet students from Nicholas De Witt of the Russian Research Center at Harvard University. Its figures on the United States were from various sources.

Georgia Tech Expects More Students, Higher Starting Salaries For Grads

The Georgia Institute of Technology, the largest engineering institution in the South, with an expected enrollment of 5,400 full-time students, will be bursting at the seams with the opening of fall quarter classes on September 26, reports Prof. William L. Carmichael, registrar and director of admissions.

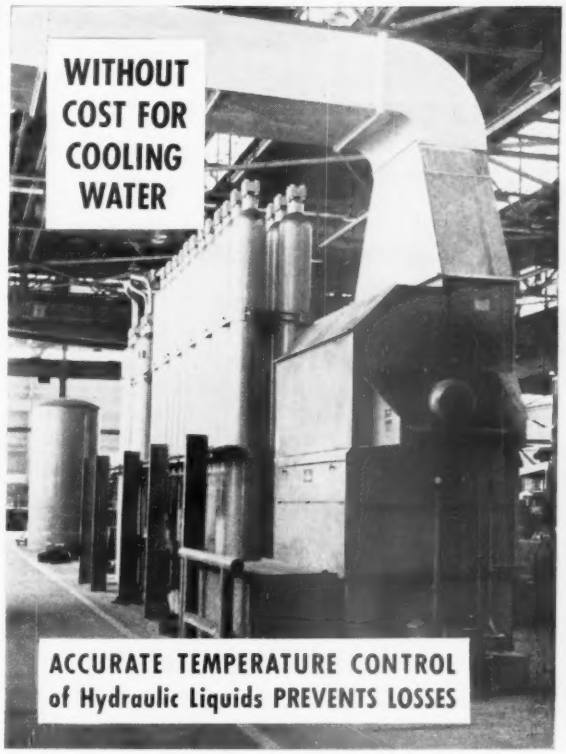
The demand for engineering, science and industrial management graduates is still so great, according to Dean Fred W. Ajaz, in charge of placement, that interviews for graduating seniors with representatives of more than 700 industrial firms have already been scheduled through May, 1957. He predicts that the average starting salary offered the class of 1957 will be $435 a month, an increase over the preceding year.

Tesla, Kettering, Terman, Hoover To Be Honored By AIEE, Oct. 1-5

Two of the nation's foremost inventors, Nicola Tesla and Charles F. Kettering, and an outstanding educator, Dr. F. E. Terman, of Stanford University, will be among those honored during the five-day fall meeting of the American Institute of Electrical Engineers in Chicago, October 1-5.

The electrical engineers will observe the hundredth birthday of Tesla and on behalf of the engineering profession will observe the eightieth birthday of Mr. Kettering. Dr. Terman, who is provost of the university and dean of the School of Engineering at Stanford, will be the first recipient of the AIEE Members-for-Life Fund Medal in engineering education.

Also to be presented will be the Hoover Medal, which will be awarded to Herbert Hoover, Jr., Under Secretary of State. The Medal is given "by engineers to a fellow engineer for distinguished public service."



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Clarence H. Linder Elected AIEE Director

Clarence H. Linder, a member of NSPE, has been elected a director of the American Institute of Electrical Engineers.

Mr. Linder, vice president, engineering, General Electric Company, New York, fills the vacancy caused by the resignation of M. S. Coover, who has been elected president of the Institute. The latter is also an NSPE member.

A resident of Scarsdale, N. Y., Mr. Linder has been with General Electric Company since his graduation from the University of Texas with a master's degree in electrical engineering.

Fiftieth Anniversary Session Planned By IES

The annual technical conference of the Illuminating Engineering Society, highlighted by a celebration of the fiftieth anniversary of the Society's founding in 1906, will be held in Boston, Mass., September 17-21.

It is expected that more than 1,000 persons—a record turnout—will attend the conference at the Statler, according to Robert F. Hartenstein, president.

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New American Standards Publication Available

Sixteen hundred American Standards are indexed in the new *List of American Standards* just published.

About 275 of these are in the field of civil engineering and construction. They include codes for building and plumbing, test methods and specifications for building materials of all types, fire tests and safety precautions in construction, modular coordination and many other related items.

The publication is available free from the American Standards Association, 70 East 45 Street, New York 17, N. Y.

Production Supervision Program at Stevens

The constant need of industry for men and women prepared to assume jobs as foremen or supervisors has led to the inauguration of a certificate program in production supervision by the Industries Training School at Stevens Institute of Technology.

The purpose of the program is to aid production workers and others in industry to acquire the basic information and skills required for advancement. The school opens September 20.

NSPE to Survey Consulting Firms

After careful study and review with consulting engineers and engineer employees of consulting firms, NSPE's Engineers - in - Employ - of - Private-Practitioners Subcommittee is taking a survey of facts regarding the status of engineers employed by private practitioners.

Linas Brown, Subcommittee chairman, explained in a letter attached to the survey questionnaire—distributed to a selected group of 1700 consulting engineers—that the purpose is to ascertain facts about engineers employed by private practitioners, with the thought that such facts on a nation-wide basis will be valuable to both the consulting employer and the engineer employees.

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Lockwood Nominated As President of ASCE

Mason G. Lockwood, a past national director of NSPE from Texas, has been nominated for president of the American Society of Civil Engineers. The nomination will go to the membership for confirmation by letter ballot, and installation will take place at the annual convention in Pittsburgh, October 15-19.

He is also a former president of the Texas SPE.

Research Corporation Makes College Grants

Grants in aid of basic research in science totaling $247,775 were made recently by Research Corporation to seventy-two colleges and universities in this country and to three institutions in Canada, according to a report issued by Charles H. Schauer, director of grants.

The funds will aid investigations in engineering, mathematics and astronomy, as well as in chemistry and physics.

This group of grants is the second this year, $186,393 having been awarded to fifty-three institutions in this country in March. Further grants for research will be made this year in September and December. Research Corporation grants to the larger universities are intended principally to help initiate worthwhile fundamental research in science.

Metal Manufacturers Announce New Officers

The National Association of Architectural Metal Manufacturers recently announced the election of Louis F. Fontana as president of the Association for the year 1956-57. Mr. Fontana, sales manager of the Irving Subway Grating Co., Inc. of Long Island City, N. Y., was elected at the NAAMM's eighteenth annual convention in Belleair, Florida.

Other officers elected were: Richard E. Stitt, Acorn Wire & Iron Works, vice president; Emil M. Pollak, Illinois Bronze Works, vice president; Wilson P. Southwell, Jr., The Southwell Company, vice president; Robert S. Woodbridge, Woodbridge Ornamental Iron Co., treasurer, and Frank A. Austin, Crown Iron Works Co., secretary.

Navy Bureau of Ships Announces New Program To Recruit Engineers

A five year work-study program for Washington, D. C., metropolitan high school graduates—designed to relieve a critical shortage of engineers at the Bureau of Ships—has been arranged between the University of Maryland and the Department of the Navy.

In announcing the new cooperative arrangement, Dean S. S. Steinberg of the university's College of Engineering said today that the new program will consist of planned work assignments in the Bureau combined with the completion of academic study leading to a B.S. degree from the university in mechanical, electrical or civil (naval architecture) engineering.

Selection of high school students for participation in the new project will be made on the basis of a competitive examination including such factors as successful completion of the Civil Service Engineering Aid examination, scholastic record, other test scores and reference checks. Additionally, those selected by the Bureau must also meet the entrance requirements of the university's College of Engineering.

Tuition costs, expenses for textbooks, laboratory fees and instructional material for all courses prescribed for degree requirements will be defrayed by the Bureau. Participants enrolled in the program will enter into an agreement obligating them to continue with the Bureau for a five year period upon completion of their training.

Nat'l. Bureau Standards Plan Move to Maryland

A tract of approximately 550 acres of land near Gaithersburg, Md., has been selected for relocation of the Washington laboratories of the National Bureau of Standards. The move will permit the Bureau to plan new buildings to replace present research facilities, which over the past fifty years have become inadequate for current needs.

The new site was selected after careful consideration as most suited to the special requirements of the Bureau's scientific and engineering programs. The choice was based upon a number of factors, including accessibility by railroad and highways as well as topography for certain technical projects.

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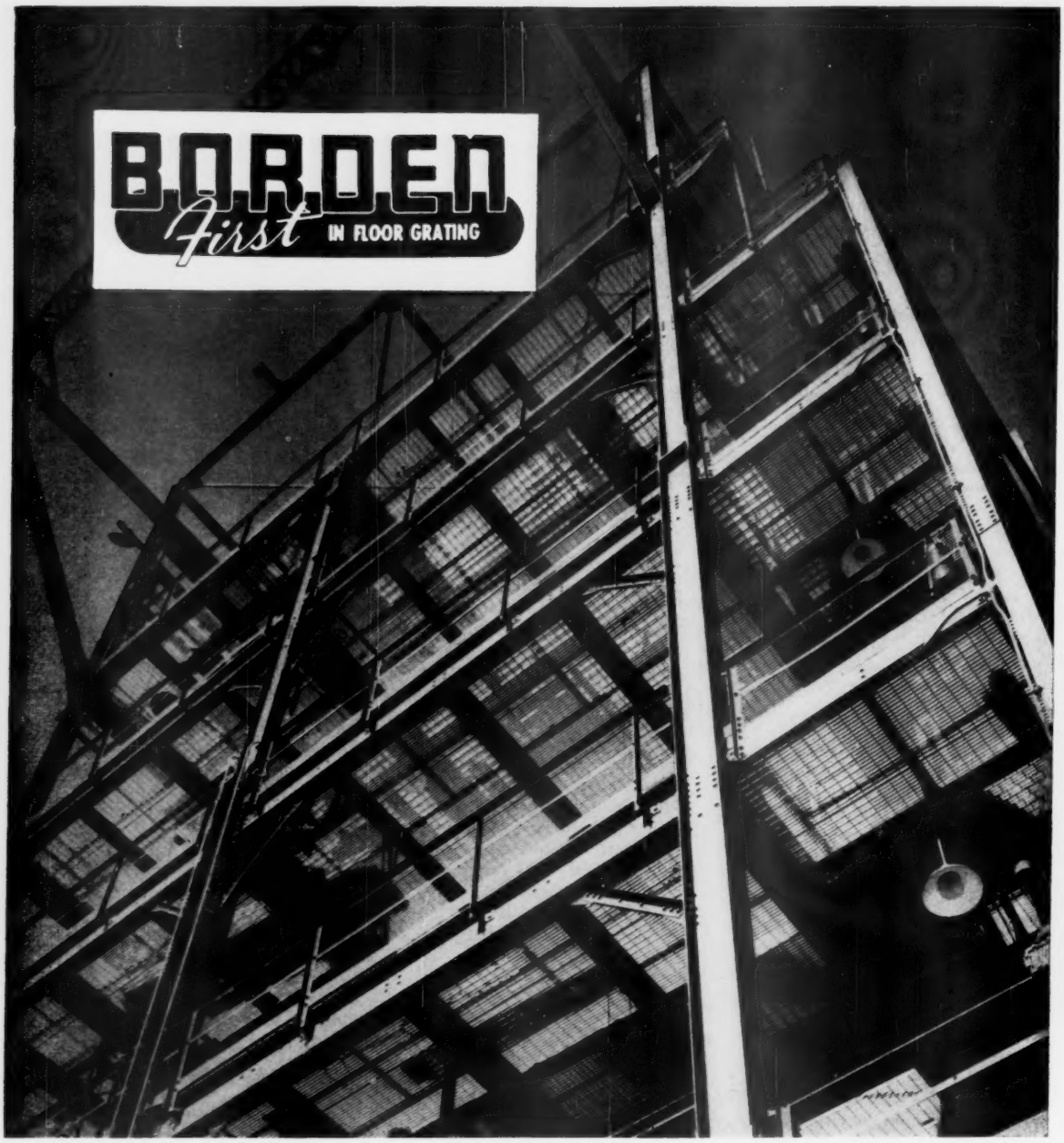

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American Engineer

The Magazine of the Registered Professional Engineer

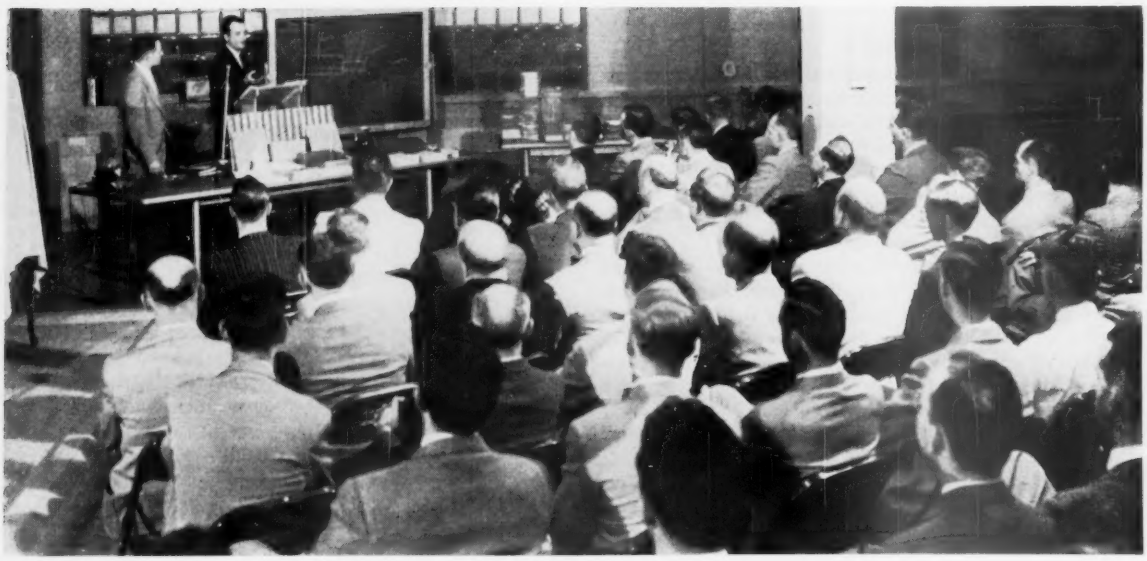
VOLUME TWENTY-SIX NUMBER NINE

Primary Job Consideration:

Professional Opportunity

BY ELISHA GRAY II

President, Whirlpool-Seeger Corporation



Seminar meetings are held regularly for R & D engineers at Whirlpool-Seeger. Guest speakers, engineering specialists in many fields, discuss new engineering techniques, new materials and other timely items.

Is Your Firm Progressive in Matters of Professional Development?

ONE OF TODAY'S "problems of prosperity" in the engineering field is that of job selection. Whether just graduated or experienced, the engineer interested in a new position has his work cut out for him in determining which of the many and diversified openings will offer him the best professional opportunity. For professional opportunity must precede other considerations if the engineer is to achieve his goals of challenge, accomplishment, and recognition.

How may the professional opportunity in a business enterprise be measured by the engineer? Two of the most important yardsticks, in my opinion, are: (1) the company's attitude toward engineering, and (2) its economic strength.

The engineer looking at a prospective employer should want first of all to learn what the company thinks of the engineering functions. In a firm to which the engineering functions are important, he is likely to make his best gains and find the greatest degree of fulfillment—professional and personal.

The hydraulic development panel, the only one of its kind in the world, was designed and built by Whirlpool-Seeger research and development engineers to evaluate the performance of water valves, pumps and other hydraulic equipment. The panel shows variations in pressure, temperature, water flow rate. The washer water valve is being life tested to the breaking point.

The company to which engineering is important is likely to have engineers among its top management. Not content with giving its engineers opportunity to be heard, it recognizes them as an integral part of management, reviews engineering activities regularly, and takes into consideration engineering factors, along with those of sales and production, when developing operational procedures or product.

Besides being engineering minded, the engineer's company should be economically strong. Preferably, it should be an established leader in its field. If not yet a leader, it should have the probability of leadership, in its management, capitalization and efficiency of operation. It must be able to underwrite, with adequate facilities and personnel, the development of engineering concepts and then to translate those concepts into economic realities.

Future prospects of the company should be bright, to indicate continuity of its engineering activities.

These two factors, dependence of company operations upon engineering and economic strength, are strong positives. They indicate that the engineer will be professionally active within the company framework, that this activity will be expedited with required funds, and that the engineer will be compensated adequately for his work in terms of salary and prestige.

There are other important factors in evaluating a company from the career standpoint.

One of these is the specific extent of research and development. Are these activities restricted to immediate needs, or do they attempt to go beyond the perimeters of present knowledge and of specific company products?

To continue strong in today's rapidly expanding technology, a company must assimilate and apply new knowledge a little faster and a lot better than its competitors. A number of its engineering projects must be constantly on the technological frontiers. Engineering activities must go beyond the immediate fields of sales and production. Without ever relinquishing vigilance over current problems, the modern engineering department should be continually seeking to solve new ones in unrelated fields.

A company whose research and development activities are comprehensive can provide an engineer with a continuous flow of new learning, so that, despite his specialization, his techniques never become outmoded. Alert to new developments, he will be able to cope with new circumstances as they arise.

Beyond the direct personal benefit of a comprehensive research and development program, the engineer receives an indirect benefit in assurance that his company will continue to sail which ever way the technological winds may blow.

Whatever a man's walk in life, he wants a career which will enable him to grow in every sense of the word. Engineers, as professional men who follow a "calling" rather than an "occupation," are perhaps more conscious of the drive for growth.

IT IS ALL THE more important, then, to the engineer that he seek association with a firm which helps him to grow equally in the effective performance of his profession, in responsibilities, and in consequent monetary and prestige returns.

He, therefore, should seek a connection which will help him to rise as rapidly as his own abilities and inclinations permit; which, in encouraging his growth, will enable him, insofar as possible, to follow the direction of that growth; yet which, at the same time, is not whimsical in dealing with him as an employee.

How does a company help an engineer to grow?

First, it may encourage him to become more proficient in his specialty; to relate that specialty to over-all en-

Robert E. Lake in 1940 started on the board as a designer and draftsman, and has now become manager of Research and Development. His steps up the ladder included almost every phase of engineering such as: chief draftsman, acting chief engineer and chief product engineer.

gineering objectives by in-company seminars and discussions; by underwriting in part tuition costs of outside instruction; by sending him to national or regional professional meetings; and by facilitating his contact with new developments in his field in every way possible.

Secondly, it affords him opportunity for creative thinking. He is encouraged to suggest new approaches and permitted to prove or disprove their merits. He is given only that amount of supervision which allows him to perform most effectively as an individual.

Thirdly, he is given responsibilities appropriate to his developing talents and inclinations. He is encouraged to grow into basic research, applied research, company administration, or whatever direction seems most promising.

It is desirable that the engineer be his own "security risk," that he grow according to his own speed, without concern for advancement by seniority. This is desirable from the engineer's standpoint as well as the company's, since a company which is not making the most of its human resources is wasting them.

At the same time, the engineer must be secure enough in his position so that his performance will not be impeded by concern about how the company will treat him. A man can work effectively, knowing that his work will be the gauge of his compensation. That is a matter over which he has control. He can work effectively knowing that his position depends on the survival or failure of the company. That is a matter over which, through his work, he may have some control. But he cannot work effectively if his tenure with the company is dependent on whimsical factors, which he cannot in the least control.

These, in my opinion, are among the major points to consider in an engineering position. They give a clear picture of the professional opportunity available in a given company. They are, or should be, as important to the engineering staff manager seeking a new affiliation as to the engineering graduate looking for his first job.

Once the above points have been covered, then and only then is it time to seek information on starting pay, commuting facilities, community life of the plant city, and similar subjects. Of course, starting pay, commuting facilities, and community life can be very important plusses to an otherwise good engineering position. But they should not be considered as substitutes for professional opportunity.

Whirlpool-Seeger Corporation, as I have said before, is an engineer's company. Engineering, both research and development and product engineering, is indispensable to our organization. This is reflected in our officer group—several engineers are vice presidents. Some continue primarily as engineers, others have assumed other functions. Some of the trained engineers in our organization are plant managers. Others hold executive positions in such departments as sales, service, production, operations, and public relations.

Our Research and Development facilities are not tied down to our immediate needs. As a matter of fact, we are now increasing our basic scientific research in proportion to applied research. This is necessary to find new methods on which new appliance designs can be based.

To enable R and D to concentrate more upon basic research, it is planned gradually to move such functions of product engineering as it now performs into the product divisions, where our appliances are actually made. Model shops, for example, are being set up in the divisions to free research and development facilities.

Whirlpool-Seeger's Research and Development Department, which occupies some 80,000 sq. ft. at St. Joseph, Michigan, has plans for a new metallurgical laboratory to investigate new materials for applications in the nuclear energy field. This new laboratory will be in addition to the existing chemical, ceramic, textile, electronic, nuclear, and individual product laboratories.

As part of its research program, Whirlpool-Seeger is participating in the world's first nuclear reactor for

Rapidly growing engineering data and library contain latest research engineering information for use of all R & D engineers, whether working on a particular project or desiring general educational information.

Research and Development "task force," the engineering team that has developed a new product from the embryo stage to a practical item, is shown laying plans to continue as the team that makes it a production reality on a divisional level. New products open many such opportunities for R & D engineers at Whirlpool-Seeger to move into key positions in manufacturing divisions.

private industrial research, now in operation at Armour Research Foundation in Chicago.

We are engaged in the nuclear field, not only for immediate application of radioisotopes to washability testing, but because we believe, that with the discoveries yet to come in nuclear physics, it is essential for every firm dependent on scientific research to train and maintain a nuclear physics staff.

As well as its own impressive and expanding engineering facilities, the company can utilize the technical knowledge, personnel, and facilities of six universities and colleges for liaison work on research projects. These institutions includes the University of Michigan, Michigan State University, Massachusetts Institute of Technology, Battelle Institute, Northwestern University, and Tri-State College.

As far as the professional development of engineers is concerned, Whirlpool-Seeger is active before they have received their degrees. A number of our seven company divisions have or are planning college cooperative programs.

A typical student under the co-op "work awhile, study awhile" programs works three months and studies three months. Students are placed on a carefully planned work program, with emphasis on work fields related to their engineering studies but including also unrelated work to broaden their backgrounds. For instance, an electrical engineering student might be assigned to work for limited times in hydraulic chemistry, physics, and electromechanisms. One of our divisions now has thirty-four co-op student engineers, with fourteen more to be added in the fall.

Our summer-jobs program isn't big, measured by some standards, because of the standards that we set for these jobs. This summer we have sixty-five undergraduate students working in the engineering departments of our various divisions. These are not fill-in jobs. The prospective engineers who are holding these temporary jobs are given specific assignments. While they are learning some of the practical aspects of their profession they are also acquiring a first-hand knowledge of Whirlpool-Seeger. A number of graduate engineers on our staff today began their careers doing undergraduate work during the summer in our engineering department.

Several scholarships-in-aid and full expense scholarships are provided throughout the company. Most of these are in the field of engineering. One division, for instance, offers three $650 one-year co-op engineering scholarships and one four-year engineering or business scholarship each year. The latter scholarship for the son of an employee.

Our Marion Division is now setting up a 15-month training program for high school graduates having little or no experience. The program would qualify graduates for positions as detail draftsmen, laboratory technician, or model maker technician.

St. Joseph R and D has a formal one-year training program designed to give graduate engineers an op-

(Continued on page 48)

About the Author . . .

Mr. Gray

Elisha Gray II has served as president of the Whirlpool-Seeger Corporation, St. Joseph, Michigan, since 1949. He was born in New York City. After receiving a B.S. degree from Massachusetts Institute of Technology in 1928, he was employed by Sears, Roebuck & Company in Chicago and Newark until 1933. He then served as vice president and general operating manager of the Cutler Shoe Company, Chicago, until joining Whirlpool-Seeger in 1938. He has held various positions in the Corporation—vice president, director and executive vice president.

Mr. Gray, who is married and has four children, is a member of various associations and clubs.

THE "WISCONSIN IDEA" ABOUT GIFTED STUDENTS

By Prof. Clyde M. Brown,

Director of Engineering Education Research,
College of Engineering, University of Wisconsin

On September 1, 1955, as a part of the activities of the Engineering Experiment Station, the central research agency in the College of Engineering at the University of Wisconsin, an unusual research program was established. To find and develop superior high school students for all professions and intellectual fields is the general objective of the program. It is referred to as unusual because, at first sight, it might seem to be a departure from usual engineering research projects.

A little reflection shows that this research is a natural and logical activity for a college of engineering. It is an established fact that the demand for engineers and scientists of superior ability is increasing. Every college of engineering desires to identify as many young men and women of superior ability as possible for development in the field of engineering and science. Statistics are available to prove that many superior high school students with aptitudes for engineering and the sciences never come to college because of lack of awareness of college as a possible goal for themselves, lack of guidance and encouragement, lack of financial support, or because of other reasons which only scientific study can reveal.

In regard to the students who do arrive at college, it is not so well established whether the quality of their training is decreasing, remaining constant, or improving. It is suspected, however, that the answer to this question may be a function of the individual high school.

To increase the number of students in the physical education classes of any institution probably will not augment, to any marked degree, the number of athletic champions. If, on the other hand, an intensive campaign be waged for locating potential athletes, the number of champions will increase in terms of the training and opportunities to develop themselves which are provided for those who are identified as superior candidates.

This program is organized to start a concentrated search, no later than the ninth grade, for students who can be the intellectually gifted champions in all professional fields.

Children in high school are in the formative process of discovering their interests. As the interests of the boys and girls reveal themselves, proper guidance can develop these interests and other latent abilities and thereby lead the students to achievements far beyond their normal expectancy. On the secondary level, the potential of the student tends to be equated with his achievement. The scientific selection of his vocation and a college thus becomes the logical conclusion of the student's counseling and guidance program.

The long range goal of the research program, therefore, is to find, develop, and conserve our most important natural and intellectual resource—gifted young men and women of superior intellectual ability—for national

The "Wisconsin Idea" is designed to start a concentrated search, no later than the ninth grade, for students who can be the intellectually gifted champions in all professional fields.

The young lady is helping the student with her make up his mind about a career. At the recent 1956 Career and Job Show in New York City students were able to discuss their futures with company representatives and engineering educators.

survival. Its ultimate success depends on cooperation between the University as a whole and the high schools of the State of Wisconsin plus financial support from the State of Wisconsin, industry, and foundations.

IN INAUGURATING the program, the preliminary activities have been limited to laying the groundwork for the research. An attempt has been made to obtain and to utilize available information from the national scene and the progress made by other programs throughout the country whose objectives are related to the purpose of this study. Past experiences of the College of Engineering have been evaluated and other departments of the university have been checked in an attempt to avoid duplication of effort. Contacts with high schools and school systems which feel that they are interested in cooperating in a scientific study of this type have been developed. Finally, the help of other departments of the university has been enlisted so that it will be available when needed.

The public schools of the nation have been faced for many years with the problem of providing education for an ever increasing number of students. The solution has been an emphasis on "common learnings" usually without adequate provision for individual differences. Gifted children, who are our country's most valuable asset, lose their identity in this procedure and gradually merge with the average group, thereby creating a hidden reserve of persons whose intellectual potential is never developed. Shortages of man power of quality in all professions are the result.

It has been concluded from the study made thus far that in every school in the State of Wisconsin there exists now and has existed, since the school was established, a potential framework to care for its mentally gifted. The challenge is to alert the administration, the faculty and the community to the existence of this framework and that now is the time to expand activities within it. In a democratic society, the citizens of a community can have the type of local school which they want—one geared to fit the needs of all the children, including the gifted, or one geared to fit the needs of all the children, except the gifted.

WHEN A high school expresses its desire to cooperate with the research program at the College of Engineering, the first thing that is done is to initiate a preliminary survey and evaluation of all techniques in use in the school for supplying the needs of the mentally superior students. The school itself analyzes its own needs in terms of the locality and the demands of the community. Such a study leads to the establishment of a trial methodology for the identification of superior students in that school. Continued study, with the help of the research program's facilities, will result in a refinement of procedures to the point that subjective claims can ultimately be made for local techniques. Objective data will result from the testing of these techniques.

At present, so much is taken for granted in the identification of gifted students, that this may well be the first area in which the gifted child is being overlooked. Regardless of what has been done on any local scene, the immediate need is to start keeping a record of slow, painstaking, and verifiable observations of what is being done for every gifted child in every school and community.

This program calls for no radical innovations in the existing administrative framework of any school. In the first approach, everything possible will be done to conserve all that is being accomplished for the mentally superior students. The program is, therefore, flexible so that it can meet the needs of the gifted children as they are discovered.

The comprehensive nature of the research program is one of its unique features. By this is meant that it is organized so as to be applicable to any size or type of school. As has been pointed out, the program begins operations with a school as it exists and in terms of what it is doing, can do, or aspires to do. With this type of simple, conservative, and inexpensive approach, immediate action in the field of the gifted can start whenever a school wants to begin. The fact that the facilities of the entire university can be combined in

About the Author . . .

Prof. Brown

Professor Clyde M. Brown was appointed to the Engineering Experiment Station in September, 1955, to direct and develop the philosophy of the high school research program described in this article. Professor Brown possesses a broad background of experience in the education and guidance of students at the high school level. With over twenty-five years of high school administration and teaching experience in mathematics in the Chicago public school system, Dr. Brown has firsthand and extensive knowledge of the problems of identifying and teaching the gifted student.

Professor Brown received his B.A. degree from St. Louis University in 1921, and his M.A. from Northwestern University in 1925. He studied for four summers at the Sorbonne University, Paris, France, receiving the certificat opres examen in 1934. In 1936 he received the Ph.D. degree from Royal University of Florence, Florence, Italy.

In addition to having expert knowledge on the problems of teaching mathematics in high school, Dr. Brown is also an accomplished linguist in French, Spanish, and Italian, with latent speaking and reading knowledge in German and Portugese.

this work means that there is no limit to the potentialities for aiding the gifted students in the State.

The centralized type of organization of the program at a place as available as the state university enables it to be of service to as many and as few schools as elect to share in its opportunities. The program has been set up on "grass-roots" bases of doing something about the immediate needs of the gifted right now.

At the end of its first period, if only a few gifted students of superior intellectual ability have been identified and developed, the program will have succeeded because its search is for quality. Maybe one of the "few" will be another Edison or Faraday. That is why the nation cannot afford to lose one mentally superior student in any school.

During September, 1956, a study will begin in six high schools in the Madison area of the methods and procedures which can be implemented for finding and identifying superior secondary school students in first year high school. It is to be noted that at no time will the College of Engineering participate in administrative policies of the schools. Its role is strictly that of the centralized university resource consultant—a center of information, advice, and assistance for all high schools which wish to cooperate with the program.

A depository of scholastic data and facts on the superior students who are identified will be established. Concomitant specialized research will be carried on at the university under the direction of this program so that procedures can be kept on a basis of sound educational practices. Graduate students from the School of Education are now being assigned to this phase of the work.

THE FIRST immediate objective of the program is to develop methods and procedures for finding superior students at the latest in the ninth grade. This leads to the next objective which is to guide and encourage the academic development of all students, identified as superior or gifted, in order that they can achieve a maximum in a course of study which will give them entrance to any undergraduate college or to any college of a university. It is obvious that all the objectives are interrelated and that emphasis on one reveals things about the others.

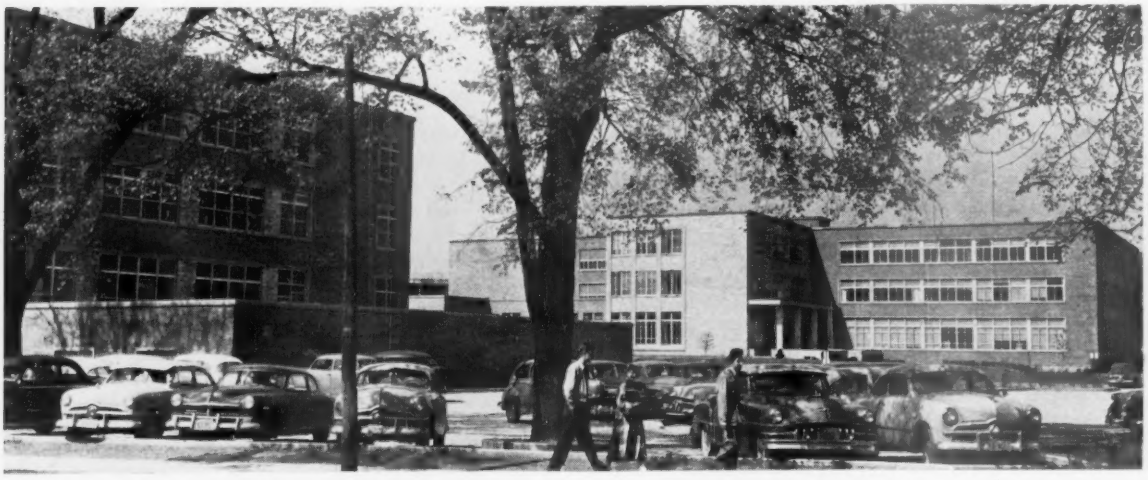
At the time of his graduation from high school a student is faced with the written record of his decisions in terms of the guidance he has received. Students in high school should have a free choice of subjects. The right to choose, however, must be exercised under careful guidance if the students are to be kept aware of the consequences of the choices they make.

A boy makes out his program in high school and decides in terms of his adolescent experience that he does not want to take mathematics. He has exercised his right of choice. The guidance directors of the school fail in their duty to this boy if they do not make it clear to him and to his parents that such a choice will preclude the right to make further choices when he graduates from high school. For example, this boy cannot elect to go to the college of engineering of any university without the frustration of having his first year encumbered with certain non-credit courses in mathematics which are required for entrance. His first decision in high school about not taking mathematics has nullified his opportunity to choose an engineering course upon graduation.

During the preliminary surveys, which have been in progress in this study, it has been very revealing to find many students who have the ability, but who have failed to qualify for the college of engineering. On career days, held by their high schools a month before graduation time, these individuals discovered to their sorrow that their freedom to take what they thought was easy or interesting now makes it impossible for them to do the thing they want to do—to go to engineering college without spending an additional semester or a year in make-up work.

High school students who are mentally gifted are explorers and should be. Unless they have unobtrusive supervision at all times, their imagination may run away with their interests. Intellectually superior boys and girls often evaporate right under the eyes of the busy teacher who has not been alerted to the significant characteristics which distinguish gifted students from the average. Many times a very intelligent child who has not been identified as such will fail to keep up his

(Continued on page 48)



Shown are the new engineering buildings at the University of Wisconsin. On the left is chemical and electrical and mechanics is at the right.

The Engineer at the National Bureau of Standards

By Dr. Allen V. Astin,

Director of the National Bureau of Standards

THE NATIONAL BUREAU OF STANDARDS is a scientific service agency for the nation's scientists, engineers, and technicians. It provides those engaged in various aspects of science and technology with critical data and measurement techniques related to standards of physical measurement. To provide these services and to fulfill its other broad responsibilities, the Bureau needs a competent professional staff of scientists and engineers to undertake a wide variety of research, development, testing, and consulting activities in the physical sciences.

When the Bureau was first established by the Congress in 1901, it had two primary standards: the meter and the kilogram. Today the Bureau maintains hundreds of standards, and it is continually being pressed for new and better standards. In addition, the Bureau conducts research on the fundamental properties of materials, on the determination of physical constants, on methods of measurement, on measurement instrumentation, and on various research and development projects requested by other agencies of the Federal Government.

This gaseous helium device for measuring the velocity of sound is typical of the experimental equipment at the Bureau of Standards. Engineers play a major role in the design and construction of this equipment.

The Bureau's responsibility to the progress of science and technology is broad in scope. Its functions have been defined by the Congress as follows (Public Law 619—81st Congress):

1. The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.

2. The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

3. The development of methods for testing materials, mechanisms, and structures, and the testing of materials, supplies, and equipment, including items purchased for use of Government departments and independent establishments.

4. Cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications.

5. Advisory services to Government agencies on scientific and technical problems.

6. Invention and development of devices to serve special needs of the Government.

These functions are further defined by a large number of specific activities, but it is sufficient to understand that they have applicability to all of the physical sciences and the engineering sciences. The Bureau's basic programs provide the essential standards which are so necessary to fabrication of interchangeable parts and which serve industrial mass production processes so characteristic of our modern economy. These basic programs also serve the nation's scientists and engineers by providing them with information which can be exchanged between scientific laboratories. To undertake all this work, the Bureau employs a staff of about 2,800 members, about forty per cent of which are professional scientists and engineers. Approximately 1,000 of these are located in Washington, D. C., and this group includes 161 engineers in the following categories:

TABLE I

Total Number of Engineers out of a Professional Population of 1,018 on March 31, 1956, in Washington, D. C.

Electrical Engineers	18	General Engineers	23
Mechanical Engineers	45	Fire Prevention Engineers	3
Hydraulic Engineers	4	Internal Combustion Power Plant, R&D Design Engineers	2
Safety Engineers	2	Aeronautical R&D and Design Engineer	1
Materials Engineers	14		
Aeronautical Engineer	1		
Ceramics Engineers	27		
Electronic Engineers	16		
Structural Engineers	5		

Total: 161

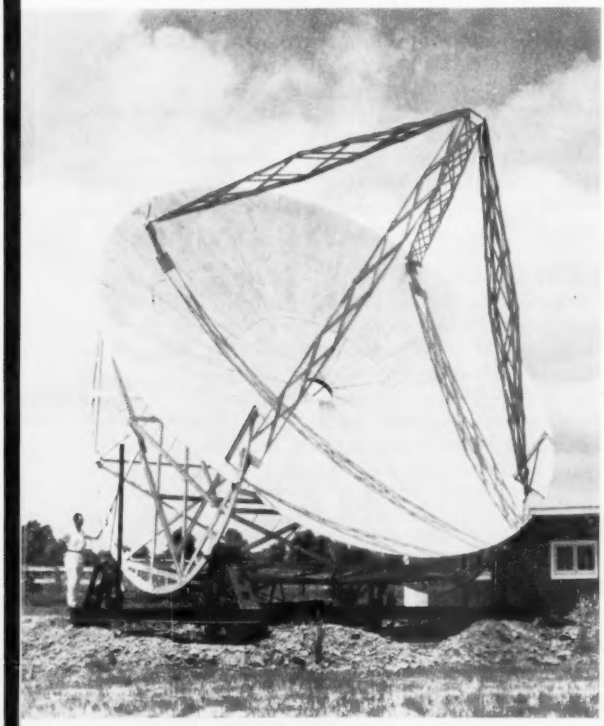
THE BUREAU also has a major installation in Boulder, Colorado. The Boulder laboratories, dedicated in 1954, are concentrated mainly in the radio sciences and in cryogenics engineering. These laboratories have about 600 employees, with more than half in the professional category. The radio propagation engineering division of Boulder, for example, has a high proportion of engineers in its professional staff. The principal types of engineers employed in the Boulder radio divisions are, of course, electronics, radio, and communications engineers.

Engineering work at the National Bureau of Standards is carried on in almost all of the scientific and technical divisions. Automotive and aircraft engineers are employed in the Heat and Power Division. The work of the Mechanics Division in aerodynamics, engineering mechanics, and mechanical instruments requires a variety of engineering specialists. The activities of the Building Technology Division are carried out by structural engineers, safety engineers, and heating and air-conditioning engineers. The Electricity and Electronics Division engages in a broad program of engineering electronics, including evaluation of tube and circuit performance. The Data Processing Systems Division is devoted to systems analysis related to the greater utilization of automatic electronic devices by Government agencies, components research and development, and techniques of increasing the reliability and flexibility of various computational and data-processing systems.

Typical of the range and type of problems which engage the engineer at the National Bureau of Standards are the following: study of the rate of oil flow in plain journal bearings; investigation of hypoid gear lubricants, ball-bearing lubrication, and lubricating greases; studies of impact vibrations and turbulent flow; development of methods for measuring extremely large currents and voltages; determination of the engineering properties of specific materials and of entire structures; study of the behavior of concretes; investigation of plain and reinforced concrete structures; study of the fundamental properties of pre-stressed concrete; and development of electromechanical and electronic devices.

This sampling of engineering activities of the Bureau is, of course, meant only to show that capable engineers will find a large number of projects which will tempt their curiosities and tax their ingenuity. One of the essential advantages of undertaking such projects at the Bureau is the opportunity to work closely with recognized scientists who have devoted years of study in their various specialties. The Bureau strongly believes in the benefits which can be achieved through the interplay of research and engineering talent. Furthermore,

Bureau of Standards engineers built this parabolic antenna to receive the first radio signals reflected off the surface of the moon. The greatest signal strength picked up was about one-millionth as strong as the signal received by most commercial receivers.



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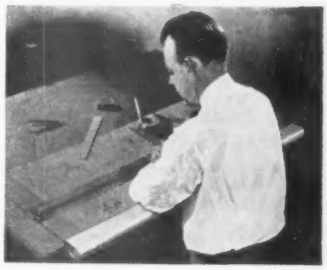

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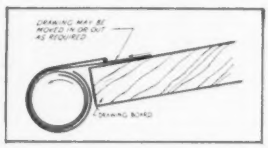

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the Bureau recognizes the significance of these "team" endeavors by encouraging the publication of research, experimental, and test findings with appropriate credit to all members of such teams.

It is important to note that the Bureau's program is stable, yet allows for expansion or change according to the potential services and interests of its staff. The Bureau, itself, has conducted research for more than fifty years: over this period, its range of activities and responsibilities has been considerably enlarged. In many cases, new areas of research have been opened up consistent with the initiative and responsibility of its professional staff. Both in policy and in practice the Bureau expects as well as grants great responsibility to its staff.

Within our organization, three avenues of opportunity are open to a staff member: (1) professional; (2) research administration; and (3) educational.

AN ENGINEER who exhibits a creative bent and is productive may expect to receive recognition for his work by promotion to problems of increasing complexity and to a place of research responsibility where he is charged with the planning and direction of work related to the Bureau's mission which is of his choosing. The measure of his work is, of course, achievement. In some cases, this may mean publication; in other cases, the measure of achievement is the recognition of contributions made to the work on a project.

The Bureau also seeks to take into consideration the administrative or supervisory bent of its employees. In such cases, the engineer may be given increased responsibility as a project leader, a section chief, and so on up the ladder of research administration, which is an important aspect of the Bureau's organization.

Finally, the Bureau appreciates the efforts of its employees to increase their professional standing and competence through added training and education. The opportunities for this type of advancement at the Bureau are indeed good. The National Bureau of Standards was the first of the major Government agencies to recognize the necessity of offering graduate study opportunities for its staff. It has for the past forty-five years maintained a Graduate School under the direction of an Educational Committee. About 600 members of the NBS staff register annually for some of the thirty-five courses offered in various technical and engineering subjects. Typical of the graduate courses which have been offered are the following: Solar Physics; Spectroscopy of Flames; X-Ray Crystallography and Crystal Chemistry; Stereoisomerism, Statistical Design of Experiments; Introduction to Mathematical Statistics; Statistical Mechanics; Advanced Optics; Methods of Petrographic Microscopy; Theory of Elasticity, and Transients in Linear Systems. In addition to such courses, the Graduate School sponsors a number of colloquia, seminars, and special lectures.

The NBS Graduate School courses have been accepted and accredited for transfer purposes by nearly all of the leading universities of this country, and in the past forty years more than 150 members of the staff have obtained their Ph.D. degrees, using work done at the Bureau in partial fulfillment of the doctorate requirements. The Graduate School also provides suitable preceptor advice for those students who wish to do thesis as well as course work at the Bureau. In addition, special evening courses afford ample opportunity for students to register directly with one of several universities near the various Bureau laboratories. Every encouragement possible is given to staff members to advance themselves in their technical fields.

In addition to such formal training, the Bureau offers unusual opportunities for informal training through the many national and international meetings held in Washington; in fact, many of these meetings are held on NBS grounds. The Bureau itself cultivates a campus atmosphere which is conducive to learning and to the general freedom which is needed for research and study.

THE THREE avenues of advancement which have been described are open to all of the Bureau's professional staff. To insure that Bureau members are considered for these opportunities, there has been established at various levels, personnel committees to review and recommend for advancement those who have demonstrated achievement. It is Bureau policy to consider its own members first for positions which open up within the organization.

The general outlook for the National Bureau of Standards is most promising. There has been, in recent years, a strong tendecy to strengthen the Bureau's basic programs. This tendency has been supported by a general recognition of the importance of the Bureau to the progress of science and technology in this country. The Bureau occupies a unique and central position in the community of scientists and engineers.

It has been our effort to explore ways to increase our effectiveness and to undertake a greater amount of work related to our basic mission. In this we have been enthusiastically supported by a great number of scientific, engineering, and other technical organizations which have provided us advice and assistance in reviewing and formulating our programs.

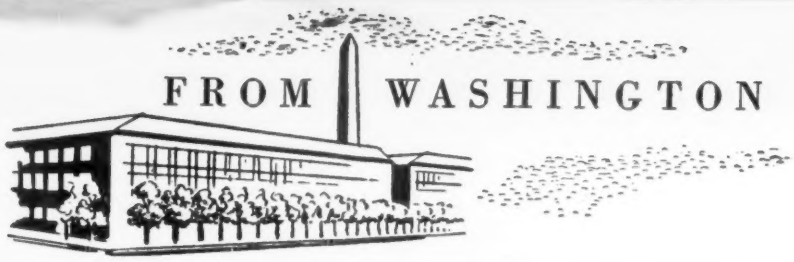
IT IS MY belief that the years ahead will find the Bureau in a period of steady growth consistent with the increasing needs of the American technology and the rapid development of science. Our responsibility demands an enlarged and more creative effort in almost all of the fields of the physical sciences and engineering. This can only mean that we must continue to seek more men of good training and competence to help us do our important work. One of the ways that we hope to bring more and talented people to our staff is by providing them with conditions which will allow for their individual growth with ample opportunity for a variety of interesting research and development projects. Our efforts to increase the level of basic studies undertaken by the Bureau, to achieve greater technical balance, and to develop long-range programs for the Bureau indicate the forcefulness with which we are seeking to meet the needs of the nation for which we have an assigned responsibility.—***End.***

About the Author . . .

Dr. Astin

Dr. Allen V. Astin is director of the National Bureau of Standards, and has devoted the major part of his adult life to the Government's research programs. A native of Salt Lake City, Utah, he received his B.S. degree in physics from the University of Utah in 1925, and an M.S. and Ph.D in physics from New York University in 1926 and 1928 respectively.

During the two years following receipt of his Ph.D degree, Dr. Astin held a National Research Council Fellowship at Johns Hopkins University. He joined the National Bureau of Standards in 1930, being named acting director in 1951 until his appointment by the President as director in June, 1952. At the Bureau he directs about 2,800 staff members working in basic and applied research in physics, mathematics, chemistry and engineering.



By
Milton F. Lunch.
N.S.P.E.'s Legislative Analyst

DEMOCRATIC AND REPUBLICAN PLATFORMS PLEDGE ACTION ON TECHNICAL EDUCATION

THE two major political parties have met, denounced each other in accordance with tradition, nominated their candidates, adopted platforms to boast of their past achievements and promised what course of action will be taken in the four years ahead if given the reins of power in Washington.

Many of the planks in the two platforms are of general interest to the engineering profession, but this year engineers and scientists are directly involved and interested in the platform statements on Federal action in the matter of training more engineers and scientists. The special attention given this subject in the two platforms is not too surprising in view of the intense interest in the subject in the 84th Congress, the introduction of numerous bills to establish Federal technical manpower supply programs, and the action of President Eisenhower in appointing two national committees to study the problem.

In the general education section of the platforms the Democrats and Republicans both promise Federal financial aid for school construction. The Republican platform refers to the White House Conference on Education and praises the Administration for establishing "a thorough nation-wide analysis of rapidly growing problems in education beyond the high schools." They promise "to press all such actions that will help insure that every child has the educational opportunity to advance to his own greatest capacity."

◄ **Representative John W. McCormack of Massachusetts, Chairman, Democratic Platform Committee.**

Senator Prescott Bush of Connecticut, Chairman, Republican Platform Committee. ►

Both parties pledge themselves to do something about the technical manpower question. In both cases the language is somewhat general and does not commit the party to any particular legislative or administrative proposal. Here are the two planks:

DEMOCRATIC—"The Democratic Party pledges itself to a bold and imaginative program devised to fully utilize the brain power of America's youth, including its talent in scientific and technical fields.

"Scholarships and loan assistance and such other steps as determined desirable must be employed to secure this objective. This is in the interest of necessary and adequate national defense."

REPUBLICAN—"We pledge ourselves to stimulate and encourage the education of our young people in the sciences with a determination to maintain our technological leadership."

The Democratic platform contains a separate additional pledge to establish "programs providing for the training of teachers to meet the critical shortage in technical and scientific fields."

Just what these pledges mean in the way of concrete action by the party victorious in November remains to be seen. But the very inclusion of such matter in the platforms is a further indication that some Federal action is in the offing.

Congressional Committees Concerned

As the 84th Congress closed down two more of its committees issued reports and recommendations on the engineer-scientist manpower situation. The Research and Development Subcommittee of the Joint Atomic Energy Committee struck a somewhat different note in its interim report following extensive hearings on the shortage. "It is important to recognize at the outset that these serious shortages are not a sign of failure but an indication of startling success," the group declared. It then followed with the explanation: "A way of life has been created in which the demands made for superior skills in every field have become so tremendous that growth and expansion have become constant elements of the normal

pattern. A society has been created in which progress is not simply a matter of occasional spurts and short-term crises. Rapid progress has become a normal part of our national life, and the skilled manpower to keep up with this steadily and rapidly advancing march of progress will be in demand for years to come."

Immediately following this observation, however, the Subcommittee members added: "But these considerations should not becloud the fact that the shortage of skilled talent in this country is a very real problem and one with which we must come to grips if we are to maintain the present rate of growth which is so essential to the Nation's strength and well-being. We are, in essence, engaged

Countless tests such as this one on a jet plane, require the services of thousands of engineers in the aircraft industry. Congress, however, is astounded at the high cost of recruiting such professional personnel.

in a battle for brainpower." The report comments that the comparisons with Russian educational progress are only one aspect of the total picture. "The shortage of trained and educated manpower would be equally pressing without the Russian threat, although it would perhaps not be as readily recognized. To that extent the pressure created by the Soviet danger may even be beneficial."

The other significant point in the report is the observation that the manpower shortages are not confined to one particular field. "The important new fact of national life is that the shortages of educated, skilled brainpower extend to all areas—from the drawing boards to distribution; from engineering to management; from the laboratory to the classroom. There is an unprecedented demand for more skilled, educated brains. The demand will increase for many years to come. Therefore, the shortage will become more critical."

Warning that it would be tragic to take short-sighted action, the study group lists ten recommendations brought out at the hearings for additional study and a thorough analysis in the next Congress "with a view to developing a concrete program of action." They are: (1) Establishment of a Federal mathematics scholarship award program, (2) Earlier identification of potentially ablest students; (3) Increased pay for high school teachers and greater flexibility in salary scales; (4) Federal contribution to private scholarship foundations; (5) Establishment of a national educational reserve; (6) Better utilization in private industry; (7) Better utilization in the armed services; (8) Aid to universities in training technical assistance representatives; (9) Marshaling free world's scientific resources; (10) Atomic energy: Expansion of reactor training programs.

The other report came from a House Subcommittee for Special Investigations of the Armed Services Committee, looking into Aircraft Production Costs and Profits. That group became interested in the engineer-scientist manpower picture because of its consideration of allowable expense to aircraft manufacturers for recruitment costs.

The Subcommittee said that when it looked into the many aspects of the problem it was "stunned" by the high-school situation. "We are appalled at the scope of the problem of basic education for scientists and engineers." The report then comments, "we could well summarize by asking this question: 'Whatever happened to reading, writing, and arithmetic?' " After reviewing the statistics on the percentages of high school students studying mathematics and sciences, the Subcommittee comes to the gloomy conclusion that "we are headed for defeat because of the diminishing number of those needed to carry the scientific and engineering load upon which technical progress depends."

Expenditures by aircraft manufacturers for contributions, donations, and other means in the interest of stimulating more engineering and scientific study received the blessing of the Subcommittee. The report specifically mentioned and approved such expenditures on a cost-reimbursement basis for scholarship funds, tuition or time allowances to employees to complete studies, cooperative educational-work arrangements, grants to employees for extracurricular studies and grants for postgraduate work.

Direct recruiting costs are clearly allowable, the Subcommittee said, but it was "astounded" to learn that it costs as much as $2,000 to recruit an engineer or scientist. The high rate of attrition and shortages, it said, are the causes of very large advertising expenditures. "For that reason, it is the subcommittee's view that efforts and expenditures made to aid and assist in the education of scientists and mathematicians are quite as important as advertising and recruiting."

The Subcommittee took a dim view of the elective system in high-school courses which, it said, "has taken a frightful toll." To this it added: "As a nation we have some soul-searching to do, both at home and in our school systems, when we consider that we are spending more on comic books each year than we spend for all of the textbooks used in our grade and high schools. To keep our present position in the world, the void among engineers and scientists will have to be filled out of the high schools of today; and we had better get back, very quickly, to 'reading, writing, and arithmetic.' "

Editor's Note— The four extracted papers presented here were given at a conference in conjunction with the recent annual meeting of the National Society of Professional Engineers. The conference on industry was held simultaneously with conferences devoted to problems of professional engineers in government, education, and private practice. Each session featured leading figures from the engineering field involved.

These papers from the conference on industry are the second in a series to be presented by the American Engineer. The papers on government were published in the July issue. Future issues will carry extracts from papers presented at the conference on education.

A Symposium . . .

Management—Professional Employee Relations

DESIRABLE MANAGEMENT POLICIES FOR PROFESSIONAL ENGINEERS (EMPLOYEE VIEWPOINT)

H. P. Cooper, P.E.
The Dow Chemical Company
Freeport, Texas

DESIRABLE ATTITUDES AND ACTIONS OF EMPLOYED PROFESSIONAL ENGINEERS (MANAGEMENT VIEWPOINT)

G. W. McCullough, P.E.
Manager, Natural Gasoline Dept.
Phillips Petroleum Company
Bartlesville, Oklahoma

DESIRABLE MANAGEMENT POLICIES FOR PROFESSIONAL ENGINEERS (EMPLOYEE VIEWPOINT)

E. E. George, P.E.
Ebasco Services
Little Rock, Arkansas

DESIRABLE ATTITUDES AND ACTIONS OF EMPLOYED PROFESSIONAL ENGINEERS (MANAGEMENT VIEWPOINT)

Wendel Burton, P.E.
Employment Mgr., Minnesota Mining & Mfg. Co.
St. Paul, Minnesota

Desirable Management Policies for Professional Engineers (Employee Viewpoint)

By Harold P. Cooper, P.E.

The Author . . .

Mr. Cooper

Harold P. Cooper, P.E., is a design engineer for The Dow Chemical Company, Freeport, Texas. He graduated from the University of Texas in 1948 with a B.S. in civil engineering. Following graduation, he worked for three years with the Texas Highway Department—for two as an inspector on a bridge job and then as a junior engineer in the bridge division in Austin.

Mr. Cooper joined Dow in 1951 as a design engineer. In addition to NSPE, he belongs to the American Society of Civil Engineers, the Texas Surveyors Association and the American Congress on Surveying and Mapping. A Navy veteran, he is also active in civic and church affairs.

WHAT should be the basis of all desirable attitudes and actions for the employed engineer? Anything that is desirable, is so, only because it helps the engineer accomplish his function in our society. This function is the application of the art of directing men and controlling the forces and materials of nature for the benefit of the human race.

All engineers render a similar service in that all apply a special skill and knowledge. The difference between an engineer in industry and an engineer in government or in consulting work is not in the service rendered but in the client for whom the service is rendered. Therefore, the characteristics we find desirable for the engineer in industry will apply to all engineers regardless of where or how employed.

The engineer's activities to benefit the human race can be broken into three separate relationships—his relations with his client or employer, with his profession, and with society. Why consider these three relationships? Any person who earns the title "Professional Engineer" assumes with this title certain obligations, and responsibilities in each of these three fields. The responsibilities are in-

separable, and the engineer should perform in each relationship.

First, let us discuss the desirable attitudes and actions which apply to all three relationships.

The engineer should have high personal integrity. This is the most valuable asset he can possess. Integrity means honesty, sincerity, intellectual fairness, and good judgment where science fails him. Selfishness should never motivate the engineer in his activities. The individual integrity of each of its members is the core of a profession. One unscrupulous engineer can hurt his profession and his employer to such an extent that years will be needed to repair the damage.

An engineer needs a good understanding of human relations. He should give honest, sincere appreciation, arouse enthusiasm in others, and criticize only when necessary and then in a manner that does not give offense or stir up resentment. An engineer cannot be effective in directing manpower unless he achieves a working knowledge of human relations.

The professional engineer needs to have all the qualities of a gentleman. He should be courteous, well-mannered, even-tempered, and not infected with the use of obnoxious language. The personal appearance of the engineer should be commensurate with his professional status. His personal habits should approach perfection.

Now let us consider the desirable qualities for relations between the engineer and his employer. These qualities may be broken down into four major groups: (1) technical knowledge; (2) communications; (3) loyalty to employer, and (4) an ability to get things done.

First, any profession must have a background of skill and knowledge in a specialized field. The engineer who desires to succeed needs to be proficient in the technical knowledge of his chosen field. Technical ability is what the engineer has to sell and it is one of the chief cornerstones of his professional career. Creativeness, ingenuity, and analytical ability will help the engineer in making a useful tool of his technical knowledge. . . .

Second, an ability to communicate effectively with his supervisor, his fellow engineer, and his subordinates in a clear, concise, to-the-point manner is very important to the engineer. In oral or written reports, due respect should be given to the viewpoint of the recipient of the report. Regardless of how brilliant and intelligent an engineer may be, technical ability cannot benefit his employer unless he has the ability to convince others he is correct. . . .

Third, loyalty to employer is an absolute necessity. An engineer who cannot be loyal to the company who employs him should terminate his association with the company. The engineer should develop pride in his company and be a faithful agent and trustee in working with company business and company manufacturing processes. In terminating his association with an employer, the engineer should give his supervisor reasonable notice. . . .

Fourth, the ability to get things done is necessary if the engineer is to be effective in contributing to the objectives of his employer. Let us discuss several factors involved in developing this ability.

Acceptance of responsibility—he must be willing to accept the responsibility for his work, be ready to take the calculated risk, and welcome the responsibility inherent in new opportunities. The engineer who will not accept responsibility can accomplish nothing.

Proper perspective—this means visualizing the scope of a complete job and placing the correct relative importance on the different phases and details of a job. The engineer who places too much emphasis on details at the wrong time may be compared to the man who cannot see the forest for the trees.

A balance of introversion and extroversion—every engineer needs sufficient introversion to make him a thinker and give him the determination and persistence sometimes necessary to progress to a successful solution. He needs sufficient extroversion to enable him to communicate his solutions to others.

Efficiency—the engineer should be a living example of efficiency in the use of his time, in planning his work, and in self-discipline. Who can efficiently direct others unless he first efficiently applies himself to his own work.

Adaptability—this means undertaking and adapting oneself to any job whether large or small. Every job has its undesirable conditions and handicaps. To the engineer, these should be stepping stones toward successful completion rather than stumbling blocks.

Aggressiveness—the engineer should apply himself to his work with energy and a sincere desire to win.

Leadership—leadership is needed to inspire and motivate others to do a good job. Enthusiasm, interest, optimism, resourcefulness, and tenacity are all important factors in leadership development.

Confidence—the engineer must have confidence in himself and his ability. Equally important, he must have confidence in the ultimate success of the projects he is associated with. These items, when developed in proper proportion, will give the engineer the ability to get things done that he needs.

Next, let us investigate the desirable qualities for relations between the engineer and his profession. A vocation becomes a profession only when those participating in the vocation work together to make it a profession. The engineer should be proud of his profession and this pride should motivate him to contribute to professional advancement and maintenance. Looking to the professional side, the engineer should help establish registration laws, enforce these laws, police against unqualified practitioners, establish and support a code of ethics, and inform the public through effective public relations. These things may be accomplished only through the group action of a professional society organization such as our National Society of Professional Engineers. Looking to the technical side, the engineer, through association with technical society organizations, should disseminate his knowledge within the limits of his company's patents or policies.

The last of the three relationships we mentioned was the relationship between the engineer and the society in which he lives. Society has granted to the engineer, by virtue of his professional status, certain privileges and recognition. Society immediately recognizes the competence of the professional engineer and has granted special privileges to him through registration laws. In return, the engineer owes something to society. This debt may be repaid through leadership in civic affairs. . . .

Most of us will agree that the items we have mentioned are desirable. However, the question is, "Do we, as professional engineers, strive to excel in these desirable characteristics?" Before answering this question, let me relate from my own experience. For the past five years I have been associated with the engineering department of the Texas Division of The Dow Chemical Company, which is a leader in setting up a professional atmosphere for the engineer in industry. The policies contributing to this professional atmosphere have been enthusiastically received throughout the nation. Some of these are encouraging and requiring registration, requiring the engineer to place his professional seal on his work, and encouraging membership and activity in technical and professional societies. With respect to what the professional engineer should be and should do, I find that these policies seem unnecessary. Of course, management should approve these activities, but why should an industry have to force upon the engineer that which is good for him? Therefore, my answer to this question must be that we, as a group, do not live up to all the obligations and responsibilities inherent in our profession.

Let each of us re-evaluate our attitudes and actions and strive to render a more desirable service to our employers.

—*End.*

Desirable Attitudes and Actions of Employed Professional Engineers (Management Viewpoint)

By G. W. McCullough, P.E.

The Author . . .

Mr. McCullough

Gerald W. McCullough, P.E., is manager, Natural Gasoline Department, Phillips Petroleum Company, Bartlesville, Oklahoma. He received a B.S. in mechanical engineering from Oklahoma A&M College in 1925. He has devoted many years to the oil industry and has held various positions ranging from draftsman, designer, process engineer, operations engineer to his present job.

He has published many papers concerning process engineering, economics, safety and natural gasolines, and is the holder of a number of patents pertaining to natural gasoline production, recovery, separation of both process and equipment nature. He is a member of several fraternal and professional organizations.

THE shortage of engineers and scientists in the country poses a serious threat to our future economic development and to our national security. To alleviate the critical situation, we are of the opinion that industry must greatly increase the effectiveness of its available engineers. We believe that to attain maximum efficiency in industry it will be necessary to provide professional engineers with the opportunity to develop their professional, economic, and social abilities to the fullest extent.

The professional engineer employed by industry should not be singled out as a privileged type of employee, but on the other hand he should be treated as a professional man within the framework of the organization. When we speak of the professional engineer, it is assumed that the "courtship" period involved in initial employment and the subsequent period of training and adjustment have been completed.

Avenues for professional development are of utmost importance to morale, and the effectiveness of the engineer in any organization depends on industry providing and encouraging the following:

(1) *Adequate facilities for efficient work in the form of modern equipment, ample office space, and good secretarial help.*

Adequate facilities are important to the engineers in two respects. First, the provision or lack of provision of adequate facilities is an indication of the management's estimate of the importance of its engineers and consequently is of considerable importance as a prestige factor to the engineers. Of perhaps even greater importance is the direct bearing adequate facilities have on the efficiency with which the engineers can work. . . .

(2) *Sufficient assistants to relieve him of non-engineering and semi-engineering detail.*

Engineers must be relieved of as much non-engineering and semi-engineering detail as possible if the engineers are to be fully utilized. As the shortage of technical graduates becomes more acute, there will be more of a tendency to restrict engineers to strictly technical work requiring the services of a graduate engineer. This action will in many instances be less a matter of choice than of necessity. Engineers must adopt a flexible definition of what is and what is not technical work. In the natural course of progress complex processes and operations tend to become simplified as we learn more about them. Consequently, functions which are considered at the outset to be highly technical in nature sometime become routine as experience is gained and can eventually be successfully performed by non-technical personnel. . . .

(3) *Challenging jobs with the opportunity to broaden experience by some plan of job rotation.*

Any worthwhile engineer must be constantly challenged by the work he is assigned. Once he feels that his work

has become routine and that he has ceased to develop, he will become dissatisfied with his job. Job rotation is an excellent way of avoiding this situation. Job rotation, however, must be carefully planned if the engineer is to gain the proper experience and training. Specialization has become an unavoidable rule in industry. It is no longer possible for every engineer to learn every phase of his company's business or even of his own department's business. He must inevitably choose a certain phase of the business in which to advance. Plans of job rotation should take into account the field in which the engineer is particularly suited and in which his interest lies. . . .

(4) *Favorable environment for the development of*

ideas and assurance that full credit will be given for the development of such new ideas.

The environment under which each engineer works will have much to do with his development and morale. This environment is created in large part by immediate supervision the engineer receives. Sound, modern, progressive methods of supervision are as important to the technical man as any other employee. The supervisor who is "employee centered" rather than "production centered" will provide the environment conducive to full development of his employees. He will not only know the importance of proper delegation, but he will also learn the principles underlying proper delegation. He will look upon supervision as a profession in the same light as engineering is a profession and will endeavor to become as adept at supervision as he is at engineering.

(5) *Active participation in technical societies and permission to publish results of non-confidential work over own signature.*

Since the field of engineering is a dynamic and ever-changing field for technical men, they must be permitted to actually participate in the studies and various types of research that are carried on by technical societies and associations with which they are affiliated. Such associations and contacts will serve to broaden the engineer's perspective beyond his own specialized field and even beyond his own industry. The stimulus which is provided by these contacts will be of real benefit not only to the society itself, but to the company and the department for which the engineer works.

(6) *Keeping abreast of recent developments through attendance at technical meetings, seminars, conferences and special schools—short courses.*

The coroliary to number five is that engineers should be permitted to keep abreast of new development not only through active participation in their professional societies, but also with the work done by others. Although the field of engineering is divided into several large branches, there is a close interrelationship between these different branches, and the work done by one may often prove to be a solution of problems confronting the others. For this reason, engineers should be encouraged to attend technical meetings, conferences, special schools, and the like and to take an interest in new developments both in their own specialized field and also in other branches of engineering which might relate to their own specialties.

(7) *Stimulation of a sense of pride in the individual job assigned the engineer by making clear that his job, as a part of a project, makes a definite contribution to his company's progress.*

Engineers, in common with all other employees, enjoy a sense of accomplishment if they are aware of the contribution which their work makes to the company's progress. We have long since passed the point at which a single individual, however gifted, can personally perform all of the necessary duties involved in a project. Our work has become much too complex, and each accomplishment is now a matter of team effort rather than individual accomplishment. Sometimes the individual engineer does not appreciate the importance his own efforts may have had in the team efforts, particularly if his contribution was not of paramount importance to the project. If engineers are to be stimulated to their best effort, they must understand the part their work contributes to the company's growth. . . .

(8) *Assurance of advancement opportunities by having a recognized policy covering promotion from within the organization.*

Opportunity for advancement is a vital factor in the morale of engineers. Our policy of promotions from within the organization, wherever possible, has done much to give assurance to our technical personnel. The problem of promotion, however, is a tremendously complex problem. Our policy goes a step beyond the concept that promotions should be made from within the company. It further provides "that job openings should be filled by promotions and transfers from within a department wherever possible." Viewed from the company's point of view, there are no limitations within the department on promotions, and a manager may select an employee from any group or location within his department to fill a given job. Where personnel with special qualification are required, he may consider employees from any department of the company. From the employee's point of view, he knows that promotions will normally come from within the department and that his promotional opportunities are not necessarily confined to his own department. . . .

(9) *Adoption and use of a workable job review system, accompanied by the payment of a salary commensurate with every stage of the individual engineer's development.*

Of all the factors affecting the efficiency and morale of engineers, few if any are more important than salary. Compensation for engineers must be commensurate with the relative value of their jobs and in keeping with the demonstrated performance on the job. Consideration of salary poses two problems.

Job Evaluation: This concerns the salary structure, that is, the rating of all engineering jobs into the company wage structure with the objective of establishing equitable relationship between the different level of jobs. This problem involves not only the relationship of jobs within the company but involves the relationship to the other com-

panies within the industry as well. . . .

Salary Administration: The second part of the problem, by contrast, is entirely personal and very definitely concerns the individual, his abilities, his attitudes, and his performance on his assigned work. Having determined the proper rate range in which the individual's job falls, the problem then becomes the compensation of the individual within that range based upon his relative standing as compared with employees in similar work.

To summarize, the problem of compensation involves two separate although closely related programs, the first being Job Evaluation and the second being Salary Administration.

Very important, too, is the opportunity for social development in the community. Industry is becoming more aware of the importance of this phase in the over-all development of its engineers. As a result, engineers are being urged by industry to play a bigger role in the civic, social, and charitable activities of the community. More encouragement along this line is needed for the professional engineer to realize his full usefulness to his company, his community, and his profession.—***End.***

Desirable Management Policies for Professional Engineers (Employee Viewpoint)

By E. E. George, P.E.

The Author . . .

Mr. George

Everett E. George, P.E., graduated from Purdue University in 1913 with a B.S. in electrical engineering. Since 1939 he has been associated with Ebasco Services, currently as an electrical engineer in the consulting department of their Little Rock, Arkansas, office. Prior to that time he held various positions with public utility companies.

He has been a frequent contributor to the technical press and has presented many papers on relay protection before the American Institute of Electrical Engineers. He has given a number of informal talks on organization charts, and on management policies—more particularly in relation to problems of dealing with technical personnel.

A. Highlights of the Present Time

The outstanding tendencies of recent years, as viewed by an audience like this, may include the following:

1. A continuing shortage of engineers.

2. An increasing interest in the advancement of engineering as a profession.

3. A growing tendency to doubt the long-term advantages of collective bargaining for professional people.

4. A deepening interest in the science of industrial management.

5. An increasing appreciation of the social problems which technological advances are bringing us.

B. The Ideal Employer

The list of qualifications of a good employer is long and varied, but at least part of the list may appeal to many an engineer.

C. The Position of the Professional Society

It is a very hopeful sign that our professional and technical societies now encourage the discussion of controversial questions of professional interest, and they only ask that if there is a possible conflict of interest, the contributor say whether he is speaking for himself or as an official or representative of some firm, association or other group.

D. The Position of the Author

I am going to speak as an *individual*, but as one who has been fortunate enough to have had considerable contact for over forty years with many employers, many employees, and various groups, professional, technical, and otherwise. I have reached an age, status, and salary, which I hope enables me to talk objectively.

E. The Problem of Conflicting Obligations

The easiest way to cloud up an issue is to assume that everybody has a right to be interested in everything and to exert pressure on everybody else. The best way to clear the air is apply the 2000-year old admonition: "Render unto Caesar the things that are Caesar's."

F. Ideal Employment Conditions for Engineers

1. The ideal employer respects the right of an employee to quit or to change employers on reasonable notice. If he can't persuade the employee to stay, he helps him to find a suitable job elsewhere, even with a competitor. . . .

2. The ideal employer views the present increasing salaries for young engineers as a logical and healthy manifestation of supply and demand. He knows that supply and demand can interact only in a free market. We have a free market for engineers just graduating.

3. The ideal employer tries to bring the salaries of older engineers in line with those of the younger engineers, not solely as a matter of equity, but for self-preservation, because he knows that the attitude of middle-aged engineers is the key to the shortage of engineers. . . .

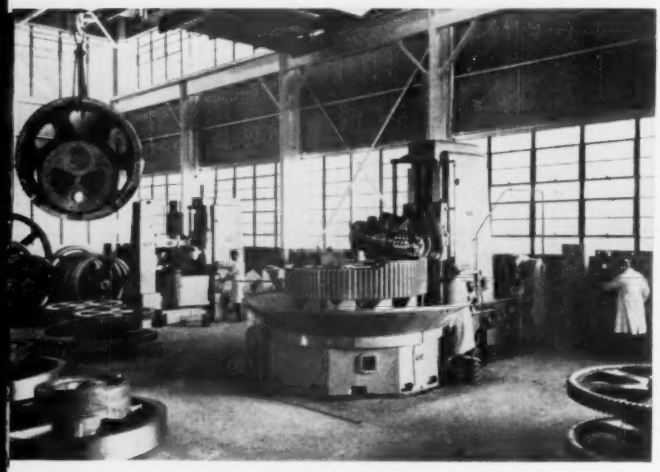
In the forty years since the base period (1910-1915) the general wage and salary level in the United States has increased from five to seven times. This increase applies to the organized construction trades, factory earnings (both organized and unorganized groups), and to common labor (both farm and urban)—for all of which there are adequate statistical records. The starting salary of the young engineer with a B.S. degree is right in line with this general average.

The pay of semi-skilled labor is now eight to twelve times what it was in the base period. This accounts in part

for so many boys leaving high school to go to work.

The pay of middle-aged engineers has, on the average, only gone up to between three and five times the levels in the base period. . . .

4. The ideal employer takes the side of his professional employees in any contest with a collective bargaining agency. He knows that most individual employees have neither the time, money, nor qualifications to present and defend their interests at the state and national capitals. Unionism and professionalism are truly incompatible, so union organizers try to tell the engineer that he is not and never can be a professional. The engineer can be a professional if his employer will let him, and if he truly wants to be a professional. . . .



5. The ideal employer is willing to raise the question as to whether collective bargaining is a divinely ordained procedure or whether sooner or later the consumer is going to take violent steps to protect himself against inflation, perhaps first through the application of the anti-trust laws to collective bargaining. . . .

6. The ideal employer never voluntarily agrees to any scheme by which any employee has to join any private organization to get or to hold a job.

7. The ideal employer admits that present compulsory retirement systems are so unsatisfactory in practical application that they leave doubts as to the validity of the principle of the compulsory feature. New companies and rapidly growing companies have acquired most of their employees so recently that their retirement benefits will not be adequate—so why make retirement compulsory for those whose last employment began after age thirty-five?

8. The ideal employer applies no age limit in hiring engineers. When expanding his force he tries to find jobs which can be filled by those older engineers who have been forced to leave their jobs by mergers, failures, or other accidents for which the employees in question were not responsible. Likewise, the ideal employer doesn't assign his older people to supervision of rush construction jobs, prolonged and bitter labor negotiations, jobs requiring continuous travel, etc.

9. The ideal employer is willing to take a new look at the overtime situation. Is there any reason why engineers, supervisors and managers should regularly work longer hours than hourly workers? . . .

10. No matter how much we criticize the desire for security and admire the man who is willing to take a chance, we must admit that the engineer who is trying to buy a home and educate a family has obligations that tend to make him conservative—particularly if his purchasing power is decreasing from year to year, or if it is falling below that of the other learned professions. Severance pay, based on quality and length of service is an essential.

11. The ideal employer doesn't hold the opportunity for promotion to a supervisory job before every engineer as an incentive. . . .

12. The ideal employer favors opportunities for stock ownership, bonuses, or profit sharing for his engineers, perhaps in less degree than available to top management, but in sufficient degree to offer inducement, and to compensate technical people whose direct efforts are not susceptible of close measurement.

13. The ideal employer recognizes that engineering and economics need to be continually meshed together.

14. The ideal employer builds up a balanced engineering organization—not a pool of honor students, technical genuises, or future executives. An organization composed entirely of experts doesn't last long—it gets raided from the outside and it explodes from within. . . .

15. The ideal employer offers his engineers opportunities to continue their education, to join technical and professional societies and attend meetings, to participate in local supervisory development meetings, to contribute articles to the technical papers, etc. These wholesome practices are now very general. Most employers would score well by any such standards.

16. The ideal employer tries to tell his employees the things they would like to know about the company's business.

In addition, he discusses salary levels within and without his company as freely with his employees as he does with his competitors. There is nothing like publicity to maintain equity between companies, between departments, and between individuals.

17. The ideal employer treats his professional employees entirely differently from his wage earners. His relations with the two groups are as different as those with his grocer and his doctor. He doesn't let his regular personnel department, accounting department, and office systems department mess up his engineers with red tape, involved forms, and meticulous records.

18. The ideal employer combines technical and administrative supervision in so far as qualified personnel are available.

19. The ideal employer stays out of the employee's life off the job. He expects his supervisors, junior executives and professional employees to have reasonable influence in community and political life. He lets them say what they want to, except when they have to be official company representatives.

G. The Necessity of an Open Mind

The man who solves today's problems is not the type who reveres "company policy," loves the "status quo," and worships what Kipling called "the god of things as they are."

H. The Fundamental Approach to any Problem

Most of the employer's troubles are due to looking at economic problems from the standpoint of the producer and the middle man, rather than the consumer.

I. The Outlook for the Future

The engineer is inclined to be patient as long as he sees definite progress. He knows that our present difficulties developed gradually over many years. The engineer does want to see a good start made promptly on a tough job.

Many of the engineers' problems require education of and action by stockholders, directors, legislators, professional associations, etc. It is a tough, long-term job, but we know some that have already started on the work.

—*End.*

Desirable Attitudes and Actions of Employed Professional Engineers (Management Viewpoint)

By Wendel Burton, P.E.

The Author . . .

Mr. Burton

Wendel W. Burton, P.E., is manager of employment, Minnesota Mining & Manufacturing Company, St. Paul, Minn. He attended the University of Minnesota. He is a national chairman and director of the Relations-with-Industry Division of the American Society for Engineering Education.

He is also a member of the Ethics Committee of the American Society for Engineering Education, and a member of the Training Committee of the Engineers' Council for Professional Development. Mr. Burton also serves as a staff lecturer in engineering orientation at the University of Minnesota.

WHEN Paul Robbins telephoned me and asked me to speak on this subject, I was rather puzzled as to how I might best approach it. . . .

Many times in the past when searching for ideas, I have had some success by relaxing myself with music and then thinking about the subject until an idea would occur. That evening going home I decided to put a record on the record player and see if that might give me a lead. In the past, I have found such records as "Rachmaninoff's II," "Scheherazade" or "Mood Music by the Three Suns" very relaxing. This particular evening, a record happened to be on the machine that was a juke box number of my daughter's. I sat back intending to relax, but instead found myself listening attentively to the music. It was a lively piece called "The Bible Tells Me So" with full vocal treatment. The words ran something like this: "Have faith, hope and charity, that's the way to live successfully. How do I know? The Bible tells me so. Do good to your enemies and the Lord you'll surely please." It went on with several other words and stated, "Don't worry about tomorrow, just be real good today." There was a final chorus and the record ended.

Some days we are more stubborn than others, and instead of picking up one of my standby records, I decided to stay with this one. What relationship would these words have to the subject for today? At first glance it appeared very vague. The record does tell us to "have faith, hope and charity, that's the way to live successfully." We certainly want our engineers to live successfully . . . so that part appeared to be all right. The record also told us to do good to our enemies and the Master you'll surely please. Well, we want our engineers to please their superiors . . . so that part appeared worthwhile. Then it went on to state "don't worry about tomorrow; just be real good today." One of the things I have noticed in business is that the engineer who is more concerned about today seems to do a better job, and the fellow who is too busy trying to hurry tomorrow by playing politics doesn't do as good a job and may be a problem. So there appeared to be some relationship. I decided, however, to list all actions and attitudes pertaining to the subject and then study their relationship to the record. I grouped and re-grouped the attitudes and actions with this result:

Our employed professional engineer must have faith. The dictionary describes faith as trust and loyalty. He must have faith in himself as an individual capable of holding his own in competition in the business world. He must also have faith in his own decisions and his ability to make them. In order to do this, an engineer has to be sure of the basis on which his decisions are made. He must maintain an open mind until he has all of the facts and be willing to search for the facts before making a decision. The kind of individual who is always looking for shortcuts and willing to gamble on the decision being right would not qualify. The professional engineer must be willing to give a decision whether favorable or unfavorable and be ready to stake his professional reputation on the result.

An engineer must also have faith in others. He respects those working with him and considers their advice. He might not accept that advice, but is always willing to give it fair consideration. Our engineer has faith in his management and wants to be identified with them. This faith also extends to his profession and identification with those in it. There is a third area in which our engineer has faith, and that is what I would call the "scales of justice." He believes that good service and performance will bring a proper reward and as a result does not waste a lot of time trying to hurry his future through office politics. He also believes that the right way is the best way and follows through by subscribing to a code of ethics and practicing it.

The professional engineer also has hope. The dictionary would describe that as desire with the expectation of obtaining what is desired. He has hope for his future, enough hope that he is enthusiastic about his work and his career. He is optimistic on his company, his job and the assignments that he received. He has hope for the present, desiring to do his best and always finishing jobs started. Our engineer eagerly rises to the challenges of his work. His hope for the present is further evidenced by the fact that he continues self-education, not only in his own field of work, but in other areas of business as well. An engineer also has hope for the unusual; is curious about all possible experiments that might be conducted and the result of these experiments. He does original thinking, likes to do it and in his work never overlooks serendipity.

An employed professional engineer has charity. The dictionary would describe that as Christian love of his fellow man. He has charity toward others . . . is interested in them . . . willing to work with them . . . and gives aid to his fellow employees. He will not seek personal security at the expense of others, and considers service to humanity an important part of his make-up. This charity also extends to his company. He does not use company communications for self gain, but for the good of the organization. He is neither a dam, taking all communications coming in to him and using them for his own benefit; or an open faucet, passing along without any consideration all thoughts that come to him. In other words, he works through channels. Our engineer devotes his allegiance, loyalty and efforts toward furthering the company and the people in it.

Sounds pretty idealistic, doesn't it? Not very practical and something up in the clouds. If it is too idealistic, then let's modify it . . . let's water it down. When we do that it means to compromise. When you compromise where are you going to stop? Perhaps it would be better to accept it as a real challenge and aim as high as possible. In the competitive business world of this day, the company with the best manpower, technical and otherwise, and direction will come out ahead. The management whose employed professional engineers have Faith, Hope and Charity will certainly live successfully. How do I know? Because experience tells me so.—***End.***

Planning for 1957 National Engineers' Week Begins; Bahr Chairman

Planning and production of promotional materials for the 1957 National Engineers' Week are in the final stages at NSPE headquarters, John L. Bahr, new chairman for the Week, announced this month.

Mr. Bahr, of West Chester, Pa., succeeds Dr. Anatole R. Gruehr as chairman of the Engineers' Week Committee. Dr. Gruehr has been appointed chairman of the Committee on Engineering Preparation.

Chairman Bahr's first project was the securing of a list of sponsors for the Week. "The official observance of National Engineers' Week will again be sponsored by leading engineering figures," Mr. Bahr stated. The names of the 1957 sponsors will appear in the October issue of the AMERICAN ENGINEER.

Mr. John L. Bahr, P.E., National Engineers' Week Committee Chairman

The theme for the 1957 observance is "Engineering . . . America's Great Resource." Mr. Bahr pointed out that the theme was chosen because of the "increasing public awareness of the fact that the real resources of this country are not buried in the crust of the earth, but are actually walking around about six feet aboveground—in the minds and attitudes of our professional engineers." The chairman emphasized that all promotional material sent out from NSPE headquarters would be based on this general theme. He urged that chapter and state society Engineers' Week chairmen direct their committees to use this theme as a basis for local programs.

Art work and copy for the 1957 promotional kits have been approved, and the kits will be mailed to chapters and state societies on October 15. A mailing of 1500 kits will be made this year, as compared with 1200 last year. The material in the kits has been prepared on the basis of a detailed analysis of questionnaires returned from Engineers' Week chairmen for the 1956 observance.

This analysis, made under the direction of Dr. Gruehr, showed what the state and local NSPE affiliates want in the way of guidance material for the Week from the National Society.

NSPE will again offer a number of promotional aids for radio and television use. For TV there will be a set of four 1-minute films and two 20-second films. Each of the first four will be devoted to a tribute to one of the main engineering branches—mechanical, civil, electrical, and chemical. The 20-second films will feature two well-known engineering leaders, both holding high government office, who will salute the engineering profession.

The films will be exactly timed for use as TV "spots," during station breaks. All six films will be suitable for public service time. A 15-minute tape recorded program for radio will also be available.

The National Engineers' Week Committee is making arrangements to have a 30-minute color film distributed to interested NSPE affiliates. This new film, a salute to the profession and produced by a major auto firm, will be shown at NSPE's fall meeting at White Sulphur Springs, West Virginia.

Other promotional aids available from NSPE are posters, paper banners, newspaper mat stories, metal logotypes, and gummed seals. Copies of a letter of salutation from the President of the United States will also be distributed. A 12-page booklet entitled "Engineering . . . America's Great Resource" is being prepared. This will be distributed to a mailing list of over 500 industrial executives. Engineering societies and industrial firms may order bulk copies of the attractive booklet, at no cost, from the National Society. The booklet presents, in illustrated form, the case for engineering as one of our most vital resources.

A series of Action Letters, beginning in October, will be sent to all NSPE groups. These will describe various projects that can be developed locally for the Week. Personally addressed letters explaining the objectives of National Engineers' Week have been sent to a list of over 500 industrial engineering executives, and 800 publishers of daily newspapers. Similar letters will also be sent to a list of advertising agencies.

Complete descriptions of materials offered by NSPE for the Week will be carried in coming issues of the AMERICAN ENGINEER.

Draft of Ideal Registration Law Available from NSPE

Interested members of NSPE may receive copies of the preliminary draft of the Ideal Registration Law by writing to the national headquarters. The Registration Committee reports that the draft has been distributed to state societies and major engineering societies following minor clerical changes, and lines numbered for ready reference.

Attached to the Ideal Law sent to the state societies was a letter by Robert J. Rhinehart, national president, pointing out that "one of the greatest needs of the engineering profession is uniformity of state registration laws and policies and procedures of state boards."

The Ideal Law is available upon request from: National Society of Professional Engineers, 2029 K St., N.W., Washington 6, D. C.

Functional Section Receives Praise

A tribute to NSPE's functional section on the Consulting Engineers in Private Practice was contained in the form of an editorial in the July 19 issue of *Engineering News-Record*.

Referring to the functional section, the editorial stated in part that "Here is promise of a truly professional answer to urgings for employee organizations among engineers . . . "NSPE's formation of its first such group deserves the attention—and the encouragement—of all engineers."

Engineering Employment Practices

Digest

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ **As a "friend of the court," NSPE has asked the U. S. District Court for the District of Columbia to rule that the Taft-Hartley Act gives professional engineers the right to a separate election in decertification proceedings. The NSPE legal brief follows a decision by the National Labor Relations Board that the unquestioned right of professional employee separation for voting purposes in a certification proceeding does not apply to decertification cases. This reversed prior NLRB interpretation of the law. If the NLRB decision stands some twenty-two engineer-employees of Westinghouse at Jersey City, N. J., now represented for collective bargaining by the electrical workers union, AFL-CIO, will be unable to decide for themselves whether they want to continue the representation.**

The NSPE brief refutes the NLRB claim that the law does not require a separate vote for professionals in decertification cases. The brief argues that the language of the law giving professionals the separate vote is part of one all-inclusive section which covers both certification and decertification proceedings. Tracing the legislative history of the Taft-Hartley Act, NSPE points out that the professional provisions were obtained to solve the problem of forced inclusion of professional employees with nonprofessionals without regard to the form of proceeding.

The court is also advised in the brief that the NLRB based its decision, in part, on the claim that a separate decertification vote by the professional employees might result in their no longer being represented for collective bargaining. To this NSPE stated that the law clearly provides such a right and the Board's reasoning on this point is arbitrary and illegal and "flies directly in the face of the crystal-clear intention of Congress to specifically permit that choice."

* * * * *

✓ In a further move to meet competition from private industry, the Federal Government will pay higher starting salaries to certain aeronautical research engineers, chemists and physicists. The new starting rates will be the same as the present top salary rate for the grade in each instance. Present employees below the new rates will also receive the benefits. The changes are: GS-9, from $6,115 to $6,250; GS-11, from $7,035 to $7,465; GS-12, from $7,570 to $8,645; GS-13, from $8,990 to $10,065; GS-14, from $10,320 to $11,395; GS-15, from $11,610 to $12,690; GS-16, from $12,900 to $13,760; GS-17, from $13,975 to $14,835.

About thirty categories of aeronautical research engineers are affected. Initial recruiting needs at the new rates were estimated at 200.

* * * * *

✓ *American Road Builders' Association has released its fourth survey of salaries for all grades of state highway engineers, in effect on April 30, 1956. Since the previous survey in September, 1954, twenty-nine states and the District of Columbia have increased salaries in practically all grades, with some increases in other states. Average salaries are reported in twenty-one categories from rodmen to chief administrator-commissioner, showing both minimum and maximum averages. Also included is a recommended minimum salary schedule by the American Association of State Highway Officials (1954). The figures are broken down by each state. For copies of the survey write to ARBA, World Center Bldg., Washington 6, D. C.*

* * * * *

✓ **Engineers at Fairchild Camera and Instrument Corp. will gain increased recognition for their creative efforts in 1956 as a result of a new corporate-wide policy affecting all technical personnel, according to a company announcement. The program includes a plaque for the best patent of the year. Inventiveness is a major criterion in salary changes and job advancement for engineering personnel, it was stated. All patent applications will specify the engineer's name and will receive maximum publicity.**

* * * * *

✓ American Management Association will hold a meeting on management's responsibility in orientation, placement and training of engineers and professional personnel, Nov. 26-27, Los Angeles. Other meetings include evaluation and measurement of research and development, Nov. 12-14, New York; how to cope effectively with shortages of scientific manpower, Nov. 26-28, New York.

* * * * *

✓ *Recent surveys by major employers of engineers disclose many work areas in which technicians can perform jobs now using professional talent below its level. "Steel" magazine reviews some of the findings in its May 7, 1956, issue and discusses where to look for technicians.*

* * * * *

Both Business and Pleasure Await Members at White Sulphur Springs

A varied and interesting program —combining both business and pleasure—is planned for members attending the National Society's fall meeting, October 25-26, in White Sulphur Springs, W. Va. As usual, the NSPE Executive Committee will convene a day earlier.

The Honorable William C. Marland, Governor of West Virginia, is slated to get the session under way with a 9:00 a.m. address of welcome.

The Education and Professional Development Group, presided over by Clark A. Dunn, NSPE vice president, have an important session scheduled following the governor's welcome. Besides several educational topics to be discussed, reactions will be heard on the Ideal Registration Law.

Regional luncheons are on tap following the morning's business meeting, with Mrs. Dorothy Draper, noted interior decorator who decorated The Greenbrier Hotel—site of the meeting, as the speaker for a ladies' luncheon. Presiding over the men's luncheons, where engineers from various locations get together, will be the six NSPE vice presidents.

Folk and square dancing in the evening will bring the first day events to a close.

The second and final day includes more professional meetings, a cocktail party, and a golfing demonstration by Sam Snead, well-known golf pro. The wind-up banquet will be presided over by the National Society president, Robert J. Rhinehart. Royal C. Bundy, president of the West Virginia SPE, will serve as toastmaster.

Following the NSPE fall meeting, the West Virginia Society has its annual meeting scheduled for Oct. 27.

Here is the Program for the Meeting

Wednesday, October 24, 1956

9:00 a.m. NSPE Executive Committee ..... Greenbrier Suite
12:30 p.m. NSPE Executive Committee Luncheon
2:00 p.m. NSPE Executive Committee ..... Greenbrier Suite
4:00 p.m. Registration ..... Auditorium Foyer
9:00 p.m. Informal Reception ..... President Tyler Room

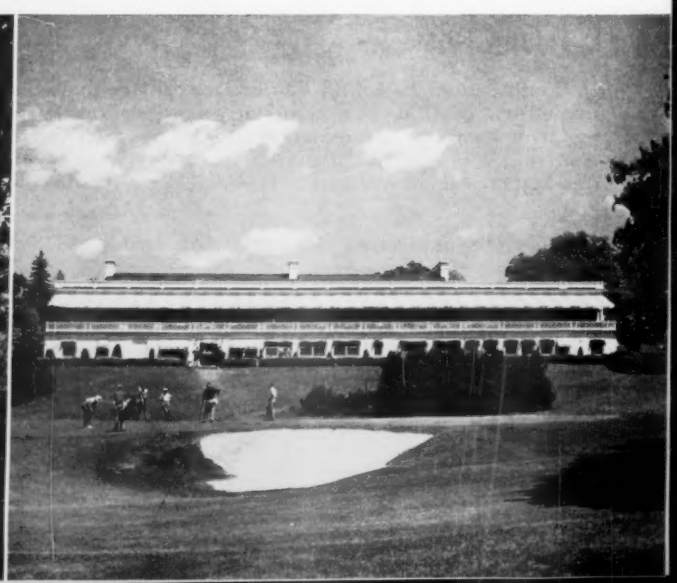
Thursday, October 25, 1956

8:00 a.m. Registration ..... Auditorium Foyer
9:00 a.m. Professional Meeting ..... Auditorium
Address of Welcome:
The Honorable William C. Marland, Governor of West Virginia
Education and Professional Development Group—Vice President Clark A. Dunn, presiding
Federal Policy Re Development of Engineers and Scientists
Motivating Young People Toward Engineering and Science
High School Teacher Problem
Engineering College Enrollments
College Engineering Teacher Problem
Encouraging Postgraduate Enrollments
High School Engineering Clubs
Reactions to Ideal Registration Law

12:30 p.m. Regional Luncheons
Western Region; Vice President Lindley R. Durkee, presiding
North Central Region; Vice President Garvin H. Dyer, presiding
Northeastern Region; Vice President Allan H. Kidder, presiding
Central Region; Vice President Harry G. Kennedy, presiding
Southeastern Region; Vice President Warner Howe, presiding
Southwestern Region; Vice President Clark A. Dunn, presiding

2:00 p.m. Professional Meeting Continues
Interprofessional Relations Group—Vice President A. H. Kidder, presiding

Widely known for its spacious and tricky golf courses, White Sulphur Springs offers tennis, swimming, horseback riding, health baths and many other activities as well.



Cooperative Activities with AIA
Liaison with EJC
ECPD-NSPE Relations
Public Relations Group—Vice President L. R. Durkee, presiding
Plans for Engineers' Week
Presentation of 1955 Professional Policies
Increased Public Relations

9:30 p.m. Folk and Square Dancing ..... Ball Room
John G. Scherlacher, director of recreation curriculum, School of Physical Education, West Virginia University, Morgantown, West Virginia

Friday, October 26, 1956

8:00 a.m. Registration ..... Auditorium Foyer
9:00 a.m. Professional Meeting ..... Auditorium
Professional Practice Group—Vice President Garvin H. Dyer, presiding
Survey of Employment Practices in Private Practice
Report on Reactions to Criteria
Developments in NLRB Court Cases
Proposed Conference on Ethical Practices Brochure
Report from Consulting Engineers Functional Section
12:30 p.m. Luncheon ——————.....—————— Golf and Tennis Club
1:30 p.m. Golf Demonstration
Sam Snead
2:00 p.m. Professional Meeting Continues
Activties Group—Vice President Warner Howe, presiding
Membership Program
Membership Refunds
Increased Chapter Activity
Operating and Services Group—Vice President Harry G. Kennedy, presiding
Revision to 1956 Budget
Presentation of 1957 Budget
Study of Committee Structure
Resolutions
Old Business
New Business
6:30 p.m. Cocktail Party
Guests of Chesapeake & Ohio Railway Company
7:30 p.m. Banquet ..... Auditorium
Presiding—President Robert J. Rhinehart, National Society of Professional Engineers
Toastmaster—President Royal C. Bundy, West Virginia Society of Professional Engineers
Invocation—Dr. John F. Montgomery, president, Greenbrier College, Lewisburg, West Virginia
Musical Entertainment—Edwin M. Steckel, Sr., executive director, Oglebay Institute, Wheeling, West Virginia

Saturday, October 27, 1956

Annual Meeting West Virginia Society of Professional Engineers

8:00 a.m. Nominating Committee
9:00 a.m. Executive Committee
10:00 a.m. General Business and Election of Officers
11:30 a.m. Adjournment

Ladies' Program

WEDNESDAY, OCTOBER 24
9:00 p.m. Informal Reception . . . President Tyler Room
THURSDAY, OCTOBER 25
12:30 p.m. Luncheon . . . Terrace Dining Room
Speaker—Mrs. Dorothy Draper
Tour of Greenbrier Hotel
9:30 p.m. Folk and Square Dancing . . . Ball Room
FRIDAY, OCTOBER 26
10:00 a.m. Historic and Scenic Tour
12:30 p.m. Luncheon . . . Golf and Tennis Club
1:30 p.m. Golf Demonstration By Sam Snead
6:00 p.m. Cocktail Party
7:30 p.m. Banquet . . . Auditorium
Optional Activities—
Golf
Tennis
Swimming
Horseback Riding
Health Baths

Fill Out and Mail Today!

Reservation Manager
The Greenbrier and Cottages
White Sulphur Springs, West Virginia

I shall attend the meeting of the National Society of Professional Engineers' Board of Directors Meeting, October 25-26, 1956. Accommodations will be available beginning Wednesday, October 24.
Please enter my reservation for the following: (Limited single accommodations available).
....Single room with private bath—$25.00.
....Twin bedroom with private bath for single occupancy—$30.00.
....Twin bedroom with private bath to be shared with .....—$22.50, per person.
....Suite (Parlor, twin bedroom and bath)—$..... Parlors are $15.00 and $22.00 in addition to the twin bedroom rate.
....Suite (Parlor, two twin bedrooms each with bath)—$..... Parlors are $15.00, $22.00 and $25.00 in addition to the rate for the two twin bedrooms.
Limited number of cottages available, accommodating from 4 to 8 persons, rates upon request.
Above rates are quoted on a daily basis, American Plan, including three meals.
Register the accommodations in the following names: (Please print or type)

Definition of Symbols: B/B—Before Breakfast, A/B—After Breakfast, A/L—After Luncheon, A/D—After Dinner

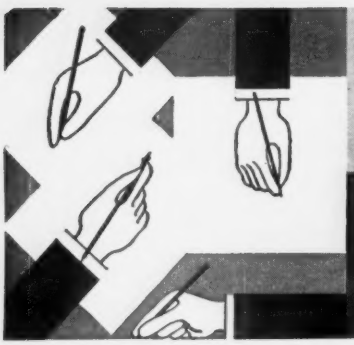
NAMES	ARRIVAL DATE	B/B	A/B	A/L	A/D	DEPARTURE DATE	B/B	A/B	A/L	A/D

Mode of Transportation: TRAIN.... AUTO.... PLANE....

SIGNED .....
(Please print or type)

FIRM NAME .....

ADDRESS .....
Street City State



Professional POSTSCRIPTS

Our Canadian friends have long impressed us with their professional-mindedness and we print below one of their more recent efforts to bring about greater understanding between management and engineers. Indeed, this essay is entitled, "Professional Recognition: A Report to Management—Engineers." The article is available in bulletin form and was prepared and is being distributed as a professional service by the Association of Professional Engineers of Ontario, 236 Avenue Road, Toronto, Ontario, Canada.

—PP—

For Management

DURING the postwar years, the attempts of Canadian industry to keep pace with the country's rapid and persistent development have focussed much attention upon the engineering profession. Unfortunately, the spotlight has been on the profession in general rather than on individual engineers; and in many instances this has given rise to a latent feeling of dissatisfaction among professional engineer employees, particularly in the larger industrial and manufacturing companies. This dissatisfaction has often led to a feeling of frustration, which results in the engineer's turning to new, and what appear to him to be greener fields.

Such shifting of employment, insofar as individual engineers are concerned, is not particularly serious; but from the standpoint of the profession as a whole it constitutes a serious problem. When one contemplates the mass migrations of trained engineers from one plant to another, one realizes that the effect of this restless and continual movement of personnel can cause a serious loss, not only to individual employers, but also to the country's economy. Heavy turnovers in engineering personnel can jeopardize efficient operation.

It has been established that job-switching by engineers is frequently the result of frustration, which, in turn, is usually motivated by lack of professional recognition on the part of the employer. Management, in many cases where job-changing is evident, has not provided a climate in which engineers can work happily and effectively while still retaining their professional attitudes. The provision of an atmosphere to encourage professional growth would go a long way towards dispelling frustration. An engineer with the "feel" of responsibility and pride in his profession is a greater asset to his employer than is a frustrated man.

A climate that will encourage and nurture professional growth among engineering employees will include:

—recognition of professional engineering as creative work.

—breakdown of a job to ensure that an individual is given the feeling of responsibility for a specific part.

—acknowledgment of achievement by the use of the professional seal, or by the signature of the individual on a specific part for which he is responsible.

This is the core around which a programme may be built. It embraces the factors that are encountered in daily job routine. However, there must also be long-term planning to go beyond this core and provide professional recognition in fact.

Such long-term planning would include:

—facilities for group discussions,

—employer-sponsored post-graduate courses for professional engineers who display a particular aptitude—the type of advanced training which would benefit both employer and employee,

—expansion of the effectiveness of non-graduate technicians and assistants by encouraging professional engineers to help educate them,

—the encouragement of membership in professional and technical organizations, and submission of papers to technical publications,

—encouragement of the exchange of ideas through management-engineer conferences.

Proper use of engineering personnel is a two-way street. It can be improved by good communications both ways, between management and engineers. Top management know that professional engineer employees do better work when kept advised of long-term planning and company policy.

Communications should ensure that the ideas of top management reach the individual engineers and that the engineers' ideas reach a top level. Communications, like filing systems, require constant checking.

The use of the "Patent Waiver," all too prevalent in this country, is not an inducement to creative thinking. If such a document is necessary because of the need to protect systems or formulae, then the company's solicitor should be required to give an equal amount of thought to the protection of employer and to the protection of inventor.

Engineering is not simply a profession in which facts are collected and the answer falls into place; neither is it one in which the solution of a few mathematical formulae is sufficient to produce a new device. It is a profession calling for the utmost in ingenuity, creative ability and sound application so that the best may be made of existing scientific information.

Perhaps the greatest single benefit of an engineering course is the mental training received in it. The profes-

SEPTEMBER MEETINGS Of Note

American Institute of Chemical Engineers—National Meeting, September 9-12, Pittsburgh, Pa.

American Society of Mechanical Engineers—Fall Meeting, September 10-12, Cosmopolitan Hotel, Denver, Colo.

American Institute of Electrical Engineers — Annual Electrical Conference, September 17-19, Muehleback Hotel, Kansas City, Mo.

American Road Builders' Association —Annual National Highway Conference for County Engineers and Officials, September 17-19, Grand Hotel, Mackinac Island, Mich.

Illuminating Engineering Society—Annual National Technical Conference, September 17-21, Statler Hotel, Boston, Mass.

Atomic Industrial Forum, Inc.—Annual Trade Fair of the Atomic Industry, September 24-28, Navy Pier, Chicago, Ill.

The Producers' Council, Inc —Annual Fall Meeting, September 25-26, Wade Park Manor Hotel, Cleveland, Ohio.

Institute of Traffic Engineers—Annual Meeting, September 25-27, Mark Hopkins Hotel, San Francisco, Calif.

Association of Iron and Steel Engineers—1956 Iron and Steel Exposition and Annual Convention, September 25-28, Cleveland Public Auditorium, Cleveland, Ohio.

sional engineer has been trained in analytical thinking. If he is given an opportunity to use this training to the full, the employer who buys his professional service will benefit, the engineer will benefit, and in the final analysis the nation will benefit.

To The Professional Engineer

THERE is a credo in the world of salesmanship that a successful salesman is one who believes implicitly in himself, his product, and his vocation. The same reasoning can be applied to a successful professional engineer in industry—he believes in himself, he believes in his calling, he believes in what his profession can do.

An engineer shows his professionalism by (a) a ready acceptance of responsibility, and (b) a professional attitude. To begin with, he is ambitious for himself; but the "drive" in him for his own welfare becomes channelled into a deep interest in the progress of his company and his profession. This broadened interest in its turn, resolves itself into an approach to problems from a broader point of view than that of mere personal self-interest. The logical and ultimate result is a fusion of ambition with professional pride, in his association with the management team.

There has been much comment lately concerning "engineer frustration." The factors involved seem to point to a lack of acceptance of responsibility on the part of the engineer, plus a lack of effective communications on the part of industry for providing a broad management picture to its professional engineers.

It is probable that much of this frustration is caused by the engineer's hesitation to accept an adequate amount of responsibility while seeking the recognition he believes he deserves. No one in any profession is entitled to recognition unless he is willing to assume responsibility proportionate to his job.

Since we are concerned here with the professional engineer, let us examine the line of responsibility which should be inherent in the profession. As in other professions, reason and the law prescribe certain standards for the engineering profession to live up to. The law operates for example to ensure that engineering work shall be carried out by registered professional engineers for the protection of the public and the safeguarding of life, health, and property. This legal requirement involves the laying down of a rigorous code of ethics for these professional engineers. Such a code of ethics is a criterion of the responsibility and consequent dignity of the engineering profession. In order to "sell" himself to management, the engineer has a very clear responsibility.

The fact that so many engineers advance into management positions can be attributed to their "over-all" type of thinking. They are the engineers who have successfully proved ability to accept many and diversified responsibilities.

An engineer, as an individual, is responsible for the success of his own career. The key to his success is the manner in which he sells himself to management. Paraphrasing the adage: "See yourself as others see you," an engineer might ask himself: "How does my employer rate me as an engineer?"

There are certain guide posts along the road to professional recognition. An engineer should get to know his company and to know the economic facts of industrial life. He should get to know about such items as opportunities for advancement, opportunities for expansion, new products, and technical trends in industry. When he has acquired a knowledge of such matters as these, he has, in effect, begun fulfilling his responsibility to himself as an engineer, to management as a professional employee, and to his profession.

Earlier, we mentioned acceptance of responsibility. Each person creates his own level of acceptance. As Archimedes demonstrated with water, levels are affected by weight displacement. This principle of physics is generally true in industry also — the higher levels of acceptance are attained by the carrying of heavier responsibilities.

Canadian engineers have a wonderfully fertile ground in which to create and build. Their professional development has a close kinship with their sense of the challenge and creative appeal which this country affords in such large measure through its vast natural resources and unlimited outlets for expansion.

The rate of an engineer's professional development is directly linked with his professional recognition in the eyes of management. Without development in himself he cannot obtain recognition by others. And to attain both, the engineer must first ask himself: "Am I aware of my responsibility to myself and my employer?" And then he must implement his awareness in action.

Professional development has many contributing factors. It is to be derived from one's engineering associations and from his contacts with other engineers. It is to be found in his appreciation of the humanities and his recognition of the other fellow's achievements. It lies along the lines of an engineer's communication with management regarding suggestions for product design improvement and time saving innovations. It is linked with his awareness of ethical conduct, and of the importance of personal appearance and deportment. It is also to be achieved through his desire to keep abreast of engineering developments and new technique.

To extend the analogy of the salesman to its conclusion, the engineer by his identity as part of the management team, must feel that he represents management in his thinking and in his actions. By his attitude he must strike a wholesome note between members of management and people in subordinate capacities, and let the tone of that note speak for him regarding his identification. A salesman is the representative of the company whose product he sells: an engineer is a representative of his company's management group, regardless of his status in the company's operations.

Wisconsin Summer Workshop — September 15-17, 1956, Nippersink Manor, Genoa City, Wisconsin.

Virginia Society of Professional Engineers—Annual Meeting, October 18-20, 1956, The Chamberlain Hotel, Old Point Comfort, Va.

NSPE Fall Meeting — October 25-26, 1956, The Greenbrier, White Sulphur Springs, W. Va.

West Virginia Society of Professional Engineers—Annual Meeting, October 25-27, 1956. The Greenbrier, White Sulphur Springs, W. Va.

North Dakota Society of Professional Engineers—Annual Meeting, November 2-3, 1956, Grand Forks, N. D.

Puerto Rico Society of Professional Engineers—Annual Meeting, November 24, 1956, Puerto Rico Institute of Engineers Building, San Juan, Puerto Rico.

NSPE Spring Meeting—February 15-16, 1957, Hotel Fort Sumter, Charleston, South Carolina.

NSPE Annual Meeting — June 6-8, 1957, Statler Hotel, Dallas, Texas.

N.S.P.E. Believes

THE ENGINEERING TEAM

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

NSPE has spoken out repeatedly with the philosophy that it is important that there be freedom of communication and exchange of ideas between all engineers regardless of their supervisory or administrative responsibility. The need for this communication, of course, is most apparent in the everyday work responsibilities and may involve several levels of administration as well as several branches of engineering specialty involved in the project about which the engineering team is concerned.

NSPE believes that this is equally true in resolving professional matters. This was a predominant thought in the development of the ground rules for functional sections which provide that any member of NSPE having a community of interest in the area of the functional section shall be permitted to participate in the considerations of that section.

The functional section development in NSPE presents a considerable challenge to the Society, for the underlying philosophy of its development presents the Society with an opportunity to give more than lip service to the philosophy of the engineering team. This point of view was recently presented in an *Engineering News-Record* editorial in the July 19 issue. The ENR editorial said in part:

"A functional group for exchange of ideas on the private practice of engineering has been set up within the framework of the National Society of Professional Engineers (ENR May 31, p. 26). This new unit is unique among organizations of consulting engineers in that it is to be open to employees of consultants as well as the partners or principals in consulting firms. There are many local and regional associations of consulting engineers, and recently a number of these have formed a national federation, (ENR July 12, p. 23) but the make-up there is exclusively management.

"Roughly, the new group will correspond to the technical divisions of the Founder Societies, which also encompass employers and employees.

"Inclusion of employees along with the consultants brought some objections when first proposed, but it is in line with the expressed NSPE policy of identifying engineering employees with the management team. Also it is in line with the desire of NSPE to improve the lines of communication between employees and employers.

"In this new functional group the profession will have an opportunity to see what an employer-employee group of potentially large size and yet with well-defined common interests can do in a joint attack on the professional and business problems of private engineering practice. Here is promise of a truly professional answer to urgings for employee organizations among engineers. Here, too, is expressed the good intention to establish means by which lessons in the business of private engineering practice may be passed along to aspiring consulting engineers."

It was perhaps more than mere coincidence that at the same meeting of the Society at which the establishment of functional groups was so extensively considered that the Society's Young Engineers Committee should present at another session a challenge to the Society to be more extensively concerned with the young engineer, his problems, his interests and the development of a program to encourage his participation. While it was recognized that the young engineer perhaps has different problems from those of the more established engineer, it was emphatically believed that it was important to integrate his interests and participation in all aspects of the Society's activities.

The *Engineering News-Record* editorial noted the opportunity for implementing this young engineers' program which can be facilitated by the establishment of functional sections. The ENR editorial concluded:

"There is great appeal to the young men, the beginners in the profession, in this newly formed organization in NSPE. And there is the opportunity, if this works, to extend just such organizational machinery for work on engineers' problems in all the functional groups that logically can be established—engineers in government, industry, education, contracting, sales, and so on. NSPE's formation of its first such group deserves the attention—and the encouragement—of all engineers."

The mere establishment of the mechanism for more effective service to the members of the Society is not sufficient. NSPE believes that it is important that the functional sections aggressively grasp the opportunities presented toward expediting and encouraging the solution to the many professional problems facing engineers.—***End.***

STRICTLY BUSINESS

Personalities . . . **A. P. Schnyder** has joined **The Lummus Company,** New York, N. Y., as a consulting engineer in their Pulp and Paper Mill Division. . . . The appointment of **H. T. Doughty** as chief engineer of the transportation Products Department of **Stran-Steel Corporation** has been announced by **C. H. Wheeler,** manager of engineering. . . . **Frank H. Magee, Jr.,** has been appointed engineer for **Ballinger-Meserole Company,** Philadelphia, Pa. . . . **Earl A. Hensal** has been named production vice president of **Seiberling Rubber Company,** according to an announcement by **Harry P. Schrank,** executive vice president of the company. . . . Promotion of **R. D. Beatty, Jr.,** to application engineer for the Tube & Hose Fittings Division, **Parker Appliance Company,** Cleveland, Ohio, has been announced. . . . **Rudolph G. Miller** has been named chief engineer of the Special Products Division of **Stromberg-Carlson,** a division of **General Dynamics Corporation.** . . . **Jens Koch,** landscape architect, has joined **Rader and Associates,** engineering and architectural firm, with headquarters in Miami, Fla. . . . **Thomas A. Kelly,** has been elected to the position of excutive vice president of **LaSalle Steel Company,** Hammond, Ind. . . . **Forrest Stretmater** has joined **Reynolds Metal Company,** Louisville, Ky., as chief metallurgical engineer for the aluminum firm's sales division. . . . **Fred Grisak** has been named as the first nuclear engineer for the engineering department of **Temco Aircraft Corporation,** Dallas, Texas.

Mr. Schnyder

The United States Testing Company announces the appointment of **Kalmer O. Olson** and **Carl B. Yoder** as senior engineers in the Mechanical Engineering Department of the company's main offices in Hoboken, New Jersey. . . . **Michael Stasko,** supervisor of quality control for the past three years for the **Cleveland Cap Screw Company,** Cleveland, Ohio, has been appointed assistant to **George E. Kaufman,** product engineer. . . . **Lionel Glauberman** has been appointed assistant chief engineer of **Assembly Products, Inc.,** Chesterland, Ohio. . . . **V. H. Peterson** has been named vice president, engineering, of **Fairbanks, Morse & Company,** Chicago, Ill. . . . **Harry W. Ward** has joined **Borne, Scrymser Company,** Elizabeth, New Jersey, as manufacturing manager. . . . Appointment of **E. A. Williams** as vice president and general manager of **H. W. Loud Machine Works, Inc.,** Pomona, Calif., has been announced. . . . **John B. Giacobbe** has been named director of the newly-created Nuclear Products Division of **Superior Tube Company,** Norristown, Pa. . . . **George J. Hannes** has been promoted to manager of the Automotive Research & Development Division of the **L.O.F. Glass Fibers Company,** Parkersburg, W. Va. . . . **R. Tom Sawyer** has been named a consultant on engineering and development problems for **ALCO Products, Inc.**

Mr. Glauberman

Three major appointments in the Axle Division of **Clark Equipment Company,** were recently announced by **Claud Fenn,** vice president. They are: **L. M. Gray,** chief engineer; **G. C. Vanderberg,** engineering consultant, and **William E. White,** new development engineer. . . . **Richard F. Phillips** has been appointed liaison engineer in the construction department of **Procon Inc.,** Des Plaines, Ill. . . . **Dr. Samuel B. Batdrof** has joined **Lockheed Missile Systems** Division's Research Branch as assistant director and head of the Electronics Division. . . . Edwin W. Hart has been appointed an assistant superintendent of the Film Emulsion Division at **Kodak Park,** according to an announcement by **Ivar N. Hultman,** company vice president and Kodak Park general manager. . . . **The Formsprag Company, Van Dyke,** Mich., announces that **James V. Huebner** has been named assistant manager of their Application Engineering Department. . . . **Edward T. Keast, Jr.,** has joined **Piasecki Aircraft Corporation,** Philadelphia, Pa., as project engineer. . . . **Richard A. Steenrod** has been appointed a materials engineer for the Silicone Products Department of the **General Electric Company.** . . . Two promotions have been announced by **Trent Tube Company,** East Troy, Wis. **G. L. Amrhein** was named chief industrial engineer and **F. J. Schiller** as new plant engineer.

Mr. Phillips

New Firms . . . **James B.** and **Lee J. Caufield** have announced the establishment of the consulting engineering firm of **Caufield & Caufield** with offices in Portland, Ore. They will engage in civil, structural, hydraulic and sanitary engineering, and in land surveying. . . . **Scanlan-McMahon Associates, Inc.,** consulting engineers, have established an office in Cleveland, Ohio. . . . Announcement has been made of the new corporation of **Pennsylvania Prestress, Inc.** Officers are **Francis Wagman,** president; **John K. Zimmerman,** vice president; **Bernard L. Frick,** secretary, and **Edward B. Wagman,** treasurer. . . . The organization of **Michigan Associates,** consulting engineers, has been annnounced by its partners **John R. Snell** and **W. I. Kenerson.** . . . **Gerald J. Spolter,** consulting civil and structural engineer, has announced the opening of his offices at Miami Beach, Fla. . . . A new Miami, Fla., architectural-engineering firm, **Connell, Pierce, Garland and Friedman,** has been formed.

Company Representatives . . . Appointment of **Process Instruments & Equipment Company** as Platecoil distributors in the Charleston, W. Va., area has been announced by the Platecoil Division of **Tranter Manufacturing, Inc.,** Lansing, Mich. Process is owned and operated by **Richard Moses.** . . . The Harry Hanser organization, New York, has been named manufacturer's representative for the Gen-A-Matic Corporation of Van Nuys, Calif. The Hanser group will cover New York, New Jersey, Delaware and the District of Columbia.

...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

CONTROL PANELS — Pan-A-Trol® Packaged Control for Industry—Bulletin GEA-6334, 12 pages, gives at-a-glance application information and lists special control panel benefits in engineering assistance, design, installation, maintenance, and field service. Descriptive data covers types of devices used for a typical Pan-A-Trol packaged control. Four-color publication also shows a case history of how experienced local and factory engineers meet special customers requirements — General Electric Company, Schenectady 5, N. Y.

—AE—

WIRE ROPE—A revised edition of Jones & Laughlin Steel Corporation's manual on wire rope is now available. "Wire Rope is a Machine," 96 pages, contains extensive information on the selection, installation, and best operating practices for wire rope. Copies can be secured by writing: Wire Rope Division, Jones & Laughlin Steel Corporation, Muncy, Pa.

—AE—

ALUMINUM DIGEST—A compact monthly publication covering all aluminum news is being made available to the entire metalworking industry by Reynolds Metals Company. It is a 32-36 page monthly publication, standard 8½ x 11 inches in size, containing 50 to 60 reviews of articles relating to aluminum that have been published in the technical press the preceding 30-60 days. To obtain this material, approximately 300 different periodicals are examined regularly. From 20 to 30 illustrations are also included in each issue of the DIGEST. In addition, the DIGEST carries a news summary of related current events, statistics on the aluminum industry, and patent listings. Anyone wishing to receive this publication monthly without charge may do so by addressing his request to Desk ES, Reynolds Metal Company, 2500 South Third Street, Louisville 1, Kentucky.

—AE—

CONCRETE FORMING—A new 24-page general catalog has been prepared by the Symons Clamp & Manufacturing Company. In three colors, it describes in detail concrete forming equipment manufactured by Symons, including the all wood panel, steel ply, high strength panels with steel cross members, H form, champ form, mag-ply panels and steel strut wide panels as well as the firm's line of hardware that includes wire ties. Copies of the catalog may be obtained by writing the firm at 4249 Diversey Avenue, Chicago 39.

—AE—

EXCAVATORS — An attractive catalog describing a newly designed 25-ton lift, ¾ cu. yd. dipper capacity 305 excavator has been released for general distribution by the Koehring Company. The 8-page, 2-color catalog tells the story of design, construction, work capacity and application of the new heavy duty excavator. Copies are free from any regional Koehring distributor or by writing direct to the Koehring Company, Milwaukee 16, Wisconsin.

STRUCTURAL STEEL—"Steel for the Structures of America" is the title of a newly published 23-page picture-booklet issued by Allied Structural Steel Companies, Suite 1791, 20 North Wacker Drive, Chicago 6, Illinois. Four-color as well as black-and-white location photos show well known bridges, buildings, schools, and hospitals in the structural steel erection stage. Request from Allied.

—AE—

RESISTANCE WELDING — A catalog of resistance welding products, accessories and materials was made available recently by Weldaloy Products Company. This literature describes and specifies standard and special spot welding electrodes, seam welding electrode wheels, dies, back-up bars, shafts, and bushings. In addition, illustrated and specified in this catalog are Weldaloy water-cooled electrode holders, adapters, horn-clamp-holder assemblies, and other accessories. This catalog can be obtained by writing to Weldaloy Products Company, 11551 Stephens Drive, Van Dyke (Detroit), Michigan.

—AE—

TRACTOR SHOVELS — The Frank G. Hough Co. has just released an informative bulletin of interest to all industries faced with bulk-materials handling problems. Titled "Modern 'PAYLOADER' Tractor Shovels In Industry," the bulletin describes and illustrates a wide variety of industrial materials-handling applications for "PAYLOADER" tractor-shovels, including case histories of "PAYLOADER" operation in a number of plants. Copies of this interesting bulletin can be secured by writing for form No. 304 to The Frank G. Hough Co., 951 Seventh Street, Libertyville, Illinois.

AIR CONDITIONING—The Trane Company, La Crosse, Wisconsin, manufacturer of air conditioning, refrigeration, heating, ventilating and heat transfer equipment, has announced a new Induction UniTrane Engineering Manual. There are nine parts to the bulletin, covering—Description of Trane Induction System, Analysis of the Building, Load Calculations and Selection of Units, Design of Air Distribution System, Design of Water Piping, Fan Selection and Primary Air Equipment, Controls, Noise Insulation and Installation Details, and Balancing—Adjusting — Maintenance of Equipment. Although the regular price is $4.00, architects and engineers may secure copies without charge through their local Trane sales office.

—AE—

SWIMMING POOLS — Modern Swimming Pool Co., Inc., offers a free copy of their complete Catalog and Data Book of swimming pool supplies, chemicals and equipment. It is a 52-page book, profusely illustrated, containing data, photographs and prices of every item needed to build a new residential or public pool, or to equip and maintain an existing pool. There is a section on pressure filter systems for both private and public pools; charts that enable you to select the proper size filter; and detailed information about the new "buried type" filters for residential pools where space is limited. There is also a section on proper pool care and maintenance, and detailed descriptions of approved water-treatment chemicals. "Berkite"—the newest discovery for the control of algae in swimming pools, reservoirs, lakes and ponds—is included in this section. For a free copy of this swimming pool reference catalog and data book, write to Modern Swimming Pool Co., Inc., Department 106, 1 Holland Avenue, White Plains, N. Y.

—AE—

MAGNETIC TAPES — Important physical and magnetic properties of 12" "Scotch" brand magnetic tapes and films are covered in a new technical data booklet available upon request from Minnesota Mining and Manufacturing Co., Dept. A6-114, St. Paul, Minn. The 12-page booklet covers such physical properties as backing thickness, ultimate tensile strength, yield strength, elongation at break, residual elongation, tear and impact strength and coefficient of expansion.

—AE—

PLANT LAYOUTS — F. Ward Harman Associates has announced the availability of their new forty-four page catalog entitled "Modern Methods for Plant Layout." This catalog contains complete information on Harman Associates materials for laying out new plants or revising floor plans of existing plants. For further information and a copy of this catalog, write directly to F. Ward Harman Associates, Halesite, Long Island, New York.

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims.

With Our Members . . .

Semi-Annual Meeting

Pres. Rhinehart Presents Mississippi Society With Official NSPE Charter

One of the most outstanding events of the semi-annual meeting of the Mississippi SPE was the presentation of a charter affiliating the Mississippi Society with NSPE by the national president, Robert J. Rhinehart of Pine Bluff, Arkansas.

Following the presentation, President Rhinehart told the Mississippi group that the Russians are graduating twice as many qualified engineers as the United States. He also stressed that it is imperative that Russia be not allowed to keep this lead in the engineering field. The next war will be a war of push buttons and we will have to have more engineers to win this type of warfare, he said.

If this country is to have an adequate supply of good engineers there has to be a greater stress made on the teaching of mathematics and science in the schools. The national president pointed out that the Society is attempting to strengthen engineering education in many ways. One way he stated is to have available engineers teach engineering classes for one or two hours a day in our high schools and colleges.

Paul H. Robbins, executive director of the National Society, re-emphasized many of the points brought out by the president.

Clyde V. Maxwell, Jr., president of the Mississippi SPE, presented certificates of outstanding service to W. E. Johnson, Jackson; George B. Denham, Hattiesburg; and H. A. Kroeze, Jackson (deceased). Mr. Kroeze, who was a charter member and past president of the Mississippi Society, served as chairman on the Legislative Steering Committee on which both Mr. Johnson and Mr. Denham served. This Committee devoted much of their time for several years to the promotion of the Engineering Registration Act of 1954 in the State of Mississippi.

NSPE President R. J. Rhinehart, left, is shown presenting a charter of affiliation to Mississippi Society president, Clyde V. Maxwell, Jr., Jackson, Mississippi. (See complete story at left)

New Mexico Chapter Elects Mann President

The Southeastern Chapter of the New Mexico SPE recently elected Thomas T. Mann as its new president.

Other officers chosen were J. Caldwell Wilson, vice president; Raynes T. West, secretary-treasurer, and Earl Y. Palmer, state director.

. . . more news on page 43

Right: At the recent annual meeting of the South Carolina SPE, the following new officers were installed, l. to r.: John H. Bringhurst, Jr., director; James H. Stephens, second vice president; Marcus R. Durlach, president, receiving the gavel; Thomas A. Able, Jr., retiring president; William McIntosh, Jr., first vice president, and John E. McMurray, secretary-treasurer.

Lower left: Officers of the newly-formed auxiliary to the Nashville Chapter of the Tennessee SPE are shown at a recent meeting, l. to r. (seated): Mrs. J. Clark Akers, Jr., third vice president; Mrs. Arthur W. Crouch, president; Mrs. A. Q. Campbell, Jr., treasurer; Mrs. Louis C. Daugherty, first vice president; (standing) A. D. McWhorter, Mrs. McWhorter, second vice president; Mrs. Karl B. Stallings, member-at-large, and Mrs. Faulkner Hickerson, secretary.

Lower right: The sixteenth annual shrimp feed was held in August by the Ozark Chapter of the Missouri SPE. A few of the 537 P.E.'s and friends who attended are shown here. They ate heartily, too. Over a quarter of a ton of shrimp was consumed!

Alphabetized by States . . .
Alabama-Minnesota

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MERRITT & WELKER
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ROBERT AND COMPANY ASSOCIATES
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Atlanta Georgia

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9½ N. Indiana St., Greencastle, Ind.

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Texas Chapter Inspects Dam At Joint Meeting

The Nueces Chapter of the Texas SPE and their wives held a joint meeting with the Corpus Christi Chapter of the American Society of Civil Engineers and their wives in August at the Wesley Seale Dam in Mathis.

An inspection of the Dam, now under construction, was made and the groups were guests of the H. B. Zachry Construction Company with a meal and entertainment.

California Chapters Hold Joint Meeting

A joint meeting was held in August of the Golden Gate, East Bay, Peninsula and Santa Clara Valley Chapters of the California SPE.

The meeting, which took place in Palo Alto, was in honor of Robert J. Rhinehart, NSPE president.

Annual Outing Held By Erie County Chapter

The Erie County Chapter of the New York State SPE recently held its annual outing at the Buffalo Launch Club, Grand Island, N. Y.

At the outing, President Earl A. Schilt held a Zone 9 membership meeting which was attended by five visiting members from Monroe County and three visiting members from Niagara County.

Lewis J. Sforzini, NYSSPE president, briefed the members and guests on the current year's membership goal of "5600 Members In 1956."

. . . more news on page 44

The Columbia Chapter, South Carolina SPE, has elected new officers. Seated, l. to r., are: Thomas S. Armour, Jr., vice president; Alton T. Riddick, president, and Marcus R. Durlach, Jr., member board of governors and immediate past president. Standing, l. to r.: Adger Lee Blackstone, treasurer; Fred G. Franklin, Harry Lee McDowell and Russell B. Maxey, members board of governors. Absent when picture was taken: William A. Sherratt, secretary, and George S. McGibbon, state representative. Mr. Durlach was also elected president of the State Society.

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Victor Ehlers Honored With Life Membership In Texas State Society

Victor M. Ehlers, of Austin, director of the Division of Sanitary Engineering, Texas State Department of Health, has become the tenth honorary life member of the Texas Society of Professional Engineers in recent ceremonies in Austin.

The professional engineer, who has been termed "a visionary" in public health by intimates, was honored at a special dinner at which TSPE president Joe Dannenbaum made the presentation, and was lauded in newspaper and television features in Austin.

A LaGrange, Tex., farm boy who became interested in engineering while working in his father's cotton field, he went on to win almost every honor possible in engineering circles and to be president or vice president of every state and national organization having to do with public health.

Many public health groups were organized by Ehlers himself. One of these was the U.S.-Mexico Border Public Health Association, formed as the result of a long-time crusade by him for tighter border sanitation controls. He was its president in 1945.

Ehlers has been guest lecturer to numerous colleges and universities, and his books—at least five of them—are used as texts in schools of public health.

A 1905 graduate of Texas A&M College, Ehlers also studied public health engineering at Cornell University. He is the Texas State Health Department's longest-term staff member, and is well known in Washington, D. C., where he was a Roosevelt appointee to the State Department Committee on Inter-American Relations in 1940 and a consultant to the National Institute of Health a few years later. He has known President Eisenhower since the latter was Chief of Staff, and in Ehler's office hangs a large picture of the President, inscribed: "To Vic from Ike with best regards."

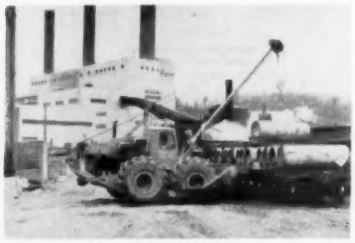
WINS TSPE AWARD—Victor M. Ehlers (right), director of the Division of Sanitary Engineering, Texas State Health Department, shows an award he received in Austin to G. R. Herzik, his chief departmental assistant. The Texas SPE cited Ehlers its tenth honorary life member for "his contributions to the profession of engineering and for unselfish and effective service to the society." He was nominated for the honor by Travis and San Jacinto Chapters, TSPE.

NEW Processes . . .

Custom-built Boom On Coal Handling Tractor Increases Utility

By adding a custom-built boom to a standard rubber tire, coal handling tractor, Indianapolis Power & Light Company has created a unit which does double and triple duty. Now, the tractor not only handles its normal job of dozing and pushloading coal handling scrapers, but also does scattered maintenance service work around the plant.

The electrically operated boom is built to function without hampering the normal use of the dozer blade. When not in use it folds back out of the way. When extended it provides a



Custom-built boom shown in use for unloading huge chlorine cylinders.

crane which will lift a weight of 3 to 4 tons at a reach of 10 to 14 feet out ahead of the tractor. Functioning in this manner it greatly extends the unit's usefulness in handling special assignments.

One of the most important of these "extra" jobs is the task of unloading chlorine for purification of water used in the power generation process. The tractor easily handles the 3,000 lb. cylinder unloadings between other jobs.

The design of the boom was originally conceived by James Lohr, superintendent of the White River Generating Station. With the assistance of members of the Field Engineering Department of LeTourneau-Westinghouse Company, Peoria, Illinois (manufacturers of the rubber tire Tournatractor on which it is fitted) problems were worked out and the design set down on paper.

The crane is unique in that it is self-erecting and can be extended or folded back by a touch of an electric switch in the tractor cab. An important consideration in its design is that at no point does it interfere with the normal tractor functions either from an operational or maintenance standpoint.

Portable Power Cart As Ground Auxiliary For Starting Jet Engines

The first portable gas turbine compressor ground auxiliary power cart to pass qualification tests and win acceptance by the U. S. Air Force, was revealed to be the AiResearch MA-1A trailer unit.

Produced by The Garrett Corporation's AiResearch Manufacturing division in Phoenix, Arizona, the trailer contains a complete, self-sufficient source of pneumatic power for starting jet aircraft engines, as well as supplying compressed air for other types of pneumatically operated equipment.

Although the ground support package, a small gas turbine engine, weighs only 190 pounds, it will start all the latest production jet aircraft including the Boeing B-52, backbone of the Strategic Air Command, as well as the North American F-100, McDonnell F-101 Voodoo, Douglas B-66 light bomber, and the Convair F-102 interceptor. Its delivery of heated compressed air may also be used effectively for ground de-icing of aircraft or equipment.

AiResearch's unit starts and maintains continuous operation at ambient temperatures ranging from a frigid minus —65F to a blistering 130°F, together with the other extremes of environmental conditions encountered at airports throughout the world. The complete automatic controls provide single push-button operation by an unskilled operator.

The compressor is of a two-stage centrifugal design with a can type combuster and single stage radial inflow power turbine. Normal output is 170 air horsepower at governed speed.

Bleed air flow is 120 pounds per minute which can be achieved 10 seconds after flipping the starting switch. The bleed air pressure is 50 psi absolute at a temperature of 420°F.

The four-wheel trailer housing the unit, which is mounted on pneumatic tires, weighs 1150 pounds and carries a 40-gallon fuel tank. A boost pump to supply fuel at a regulated 15 psig is included, plus a 24-volt battery and a winterization kit to heat the battery to a level insuring successful starting under severe winter climatic conditions. A parallel manifold in which the output of two units can be coupled, and a 30-foot flexible bleed air duct to conduct the compressed air to airframe coupling or equipment requiring pneumatic power, completes the package.

Safety features includes a quick disconnect air hose fitting automatic depressurization of the bleed air duct when load switch is in "off" position; automatic overload, over-temperature and over-speed controls; low oil pressure controls, plus provisions to prevent compressor unit from starting unless air inlet and exhaust outlets are fully open.

The Arizona division of The Garrett Corporation is currently producing the units at a rate of one every hour, according to Murray S. Gelber, vice president and manager of the AiResearch division of Arizona.

Prestressed Tee Joists For Long Post-free Spans In Workshop Roof

The problem of erecting a low cost workshop for retarded children with long, post free spans was solved by the use of Leap prestressed tee joists recently in Lakeland, Florida.

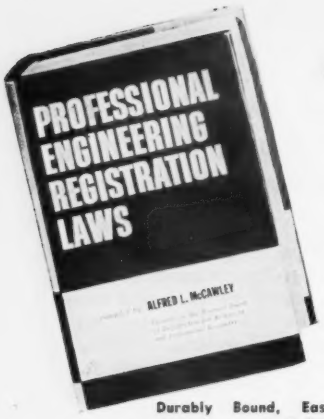
The building was 40x80 ft. workshop of the Marion Lea Training School for retarded children.

Inasmuch as funds were meager for the job, it was decided that a most economical solution would be to use Leap prestressed concrete tee joists with a clear span of 40 feet. Tectum was laid on steel subpurlins and the beams left exposed, eliminating the

Roof of the workshop for retarded children as seen during construction.

cost of a hung ceiling. A built up roof completed the job at a substantial saving.

The prestressed concrete tee joists can be used at wide spacing with any conventional roof deck construction, but in a workshop of this type with the Florida sun beating down during many months of the year it was felt the Tectum would serve as insulation and accoustical ceiling as well.



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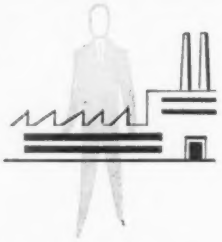

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Carl Hinshaw, Engineer–Legislator, Dies

Representative Carl Hinshaw, 62, who always took a keen interest in engineering affairs, died August 5 at the Bethesda (Md.) Naval Hospital.

A member of the House of Representative since 1938, Rep. Hinshaw's death was due to pneumonia complicated by congestive heart failure. He had been admitted to the hospital July 27.

The California Republican—as a member of the Joint Committee on Atomic Energy—strongly advocated keeping key scientific personnel from being drafted into military service when they were engaged in research activities.

As the second-ranking member of the Committee on Interstate and Foreign Commerce, he had played an important role in recent years in the development of its commercial aviation policy. In 1948, Rep. Hinshaw was awarded a Citation of Honor by the Air Force Association and in 1953 he received the Wright Brothers Memorial Trophy from the National Aeronautic Association, which was presented by President Eisenhower.

An engineer himself, Rep. Hinshaw spoke at the spring meeting of NSPE, urging the inclusion of nuclear engineering courses in graduate schools and the establishment of more specialized training centers. He also gave a detailed analysis of the scope of the engineering challenge of the atomic age.

Rep. Hinshaw, a native of Chicago, represented the Twentieth District of California.

He was a member of the class of 1916 at Princeton University, receiving his degree in civil engineering. Soon after the United States entered World War I, he enlisted in the Army and was a captain in the Corps of Engineers when discharged.

He was a member of the American Society of Civil Engineers, Society of Automotive Engineers, Institute of the Aeronautical Sciences, and honorary member, Institute of Navigation. He was also an adviser to the Radio Technical Commission for Aeronautics, a director of the National Aeronautic Association, and president of the Aero Club of Southern California, 1953-54.

Rep. Hinshaw is survived by his widow, the former Roberta Ripley, and two sons, John and William.

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Grad. MECHANICAL Reg. INDUSTRIAL Engr. 30 yrs. business & industrial exp. includes design, production, sales, accounting & industrial relations, 20 yrs. successful background as management consultant officer and executive of several companies of modest size. Prefer mgt. of industrial or adm. or staff position with larger company. $15,000. (A-509)

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Write or send application on Standard Form 57, which can be obtained at your Post Office, to Personnel Officer, Civil Aeronautics Administration, Technical Development Center, P. O. Box 5767, Indianapolis, Indiana.

Professional Development

(*Continued from page* 14)

portunity to learn thoroughly the department organization and to determine the operations for which they are best qualified.

Regularly scheduled seminars are held to keep the engineering staff informed on topics within and outside of their specialty.

For example, monthly seminars for R and D staff members attract an average of 125 out of 270 eligible persons. The following were subjects covered by these seminars in the period September, 1955 to May, 1956: industrial applications of atomic energy (speaker, Dr. Paul C. Aebersold, Isotopes Division director, U. S. Atomic Energy Commission); engineering redesign, tooling and production problems encountered in division operations; reinforced plastics; industrial design; textile evaluation; service of appliances; V-belts and V-belt drives; and decorative metal trim.

From the very wide range of conferences and conventions of both industry associations and professional societies which are held in various parts of the country, these with the closest application to our problems or to fields of general information are selected. Engineers are designated, according to their work interests and desires, to attend these events.

Our Product Development Committees, of which there is one for each appliance in production or contemplated, might also be termed Executive Development Committees. Each is, in effect, a small company within itself. Engineers rub elbows with key personnel from sales, manufacturing, accounting, and service. Exploration of product ideas, which can originate anywhere in the company, are made by these committees. When the group agrees that they have a recommendation to make, they report directly to the Corporate Officer Group. A new product development may come of this. More likely, some new executive engineering talent has been developed.

Whirlpool-Seeger's management of its engineers is in keeping with the over-all company "team spirit." Engineers are guided by their supervisors, rather than strictly regimented. Those most close to the development problems are encouraged to present and to work on their own ideas. The ideas are considered on a team basis, with free and open discussion. This approach, we have found, results in the greatest possible number of usable new ideas and, ultimately, in a more comprehensive engineering program. It also prepares the individual engineer for the next step ahead in his career.

The engineer at Whirlpool-Seeger is given every opportunity to advance in his special field of endeavor. He is also given an opportunity to extend his knowledge beyond his specialty. It is the over-all objective to familiarize each engineer with all aspects of every problem, insofar as possible. An individual may have assignments related to design, laboratory work, and a variety of special projects.

Our engineers are encouraged to make contributions to the company outside of the engineering fields. As members of the Whirlpool-Seeger management team, they may at any time contribute suggestions on other operations of the company. If the engineer shows management potential and desires, he may be trained for a management position in engineering or in another area suitable to his talents and inclinations.

Periodic reviews with supervisors give the individual engineer exact definition of his opportunity with the company.

Advancement at Whirlpool-Seeger is by merit. The company, in an expanding position, is constantly on the alert for potential executives.

Personal security is afforded the individual by two additional factors: the first of them is psychological, the second economical.

A psychological contribution to personal security is made by satisfying and dependable human relations existing between employees of every rank and their colleagues and their superiors. These warm human relations are at once the cause and effect of the Whirlpool-Seeger "team spirit." Of course, they cannot be described; we know that our human relations are good from our own experience and from the statements of both veterans and employees who have recently joined the company.

Economic security is provided by a system of compensation which includes a good salary for responsibility and performance, a substantial bonus for a better-than-average job, a savings and profit-sharing plan, and a retirement plan.

We believe in professional development. We believe in opening as many doors of opportunity to the individual as possible and then it is up to him. At Whirlpool-Seeger we know that our program of "team" play with our engineers is paying off in many ways.

—***End.***

"Wisconsin Idea"

(*Continued from page* 17)

interests because he meets a reverse in his school life. He may not let anyone at school or at home know about his predicament. Superior students at times have a tendency to retire within themselves. Unless someone is studying them and helps them to see that certain experiences are not defeats or limitations, but spring boards to greater success, they disappear into the crowd. Not only do these gifted children not reach their potential, they never become aware of the fact that they have one.

One large city school system which is devoting much time to its gifted students has become so convinced of the importance of college entrance requirements for every gifted child who graduates from high school that the gifted are required to take five subjects each semester in addition to extra-curricular work. In this way these superior students can follow their interests, but at the same time protect their right to career choices upon graduation.

It is sometimes argued that a certain student is not going to college so does not need to include college entrance requirements. No one can prognosticate today in terms of a child's immediate socio-economic environment what he may be able to do for society later in life. If the school, knowing that he is an intellectually superior individual allows him to graduate, but does not provide him with college entrance requirements during his school career, then the high school is responsible for his loss to society on his potential level. If the high school had given the student the guidance he needed, he still might never have gone to college, but he would have college entrance requirements and represent only an "interim loss" to society should he elect to continue his education at a later date under more advantageous circumstances.

SMALLER SCHOOLS in rural areas do not have the demands for many courses which are a regular part of the curriculum of an urban community. According to the law of averages, there may not be more than one

or two gifted students in a small high school. That high school is the terminal for possibly ninety percent of its students. What happens to the gifted students? This is another potential area from which society may be losing its gifted boys and girls. When one multiplies even a small loss in every school by the number of small schools in a state, he begins to realize how great this number may be.

During the past half-century the University of Wisconsin has become one of the world's leaders in the field of correspondence study through its Extension Division. The present correspondence study staff has a roster of some four hundred, many of whom are among the university's most distinguished scholars. If a student, therefore, finds himself in a small high school in an area where it is impossible, for example, for the local school to provide him with the courses in mathematics and science which he needs to meet the entrance requirements of the college of engineering, he can take these courses from the Extension Division of the university. Local school boards are authorized to defray the tuition charges for the student. This plan has been in operation for some time and has proved successful.

In cooperation with the present research program for the superior students, the Extension Division is making plans to give special attention to the courses sent to identified superior students. The individual needs of these gifted boys and girls can be met on their potential level from the resources of the Extension Division and its staff. At the discretion of the administration of any school, these correspondence courses might be given in addition to regular courses to increase the challenge to certain identified superior students. Regular classroom teachers, who find it difficult, if not impossible, to adapt instruction to all the individuals of a large class, thus have the assistance of the university in providing unlimited opportunities for the gifted members of their classes.

THE FINAL objective of the research program is the one which has been set to make the whole plan realistic. This objective is to assist identified superior or gifted students with counsel and financial aid, if needed, until they complete a degree in engineering, science, or the college of their choice.

To every identified student assurance will be given of cooperation by the College of Engineering with his high school at all times. He will receive individual counseling from his first year in high school. He will have the help which he needs at all times for determining his college potential and for developing the individual "know-how" to finance himself in the college best suited to his aptitudes.

The experiences of the College of Engineering has proved that scholarships are available for qualified students. These scholarships usually cover up to fifty per cent of the total costs of the first year in the college. In exceptional cases increased financial support can be anticipated. All during their college years, other scholarships become periodically available, if needed, for those who can qualify. Information about all such opportunities together with help in applying the information to their individual problems will always be available to students enrolled in the research program.

Without adequate leadership the United States can never achieve national security nor will the nation be able to strengthen the free world. If thinking Americans wish to guarantee adequate resources of scientific and professional personnel to meet their immediate and future needs, they must take immediate action and follow it by a purposeful and sustained effort to identify the mentally superior boys and girls before the end of the ninth grade and then guide and educate them to the maximum utilization of their potentials. The challenge to every state in the Union is to supply the nation with leaders. This program represents centralized action on the Wisconsin scene to meet that challenge.—***End.***

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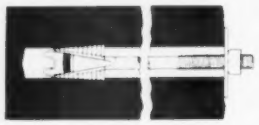
ROCK BOLT — Item 1



Capable of sustaining a 40,000 pound pull-out in hard rock, a ¾" steel rock bolt with a forged anchoring head and expansion shield is now being made available for tunnel work and general construction purposes by Republic Steel's Bolt and Chain Div. The bolt provides support by tying rock together. Intended to provide maximum shoring safety in startified and unstratified rock for ribs, walls and roofs in all types of tunnels, aqueducts, railroad side cuts, building foundations, dams and other permanent construction.

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FOR ACOUSTICAL CEILINGS — Item 2

Acoustical Formboard with a Full Random sound conditioning interior surface has been announced by Armstrong Cork. Co. Designed for use with lightweight, poured-in-place roof decks, it is composed of a ½" layer of asphalt-impregnated Temlok fiberboard laminated with a vapor-permeable adhesive to a ½" layer of Armstrong Cushiontone acoustical material. Random perforation pattern gives the material a noise reduction coefficient of .55, and adds a decorative note. Factory primed interior surface, with light reflection coefficient of .78, needs no further finishing, but may be painted, if desired, without affecting acoustical efficiency.

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TEMPLATE FOR ELECTRICAL SYMBOLS — Item 3

Keuffel & Esser Co. has added a new electrical symbol template to its Leroy lettering and symbol-drawing equipment that conforms to the new and revised Graphical Symbols prepared by the American Standards Association. Use of these up-to-date symbols is now required to meet military specifications. Bell Laboratories, IBM Co., and Raytheon, assisted in the selection of the symbols and in their arrangement on the template. Available in three sizes: one is shown in the ASA Bulletin; another half again as large; and a third twice as large.

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CONTROL OF DUST — Item 4

A new product to combat dust is GOLDEN BEAR DUST-BINDER, said to be the most effective means of dust control yet developed. In farming operations, does not sterilize the soil, and is not harmful even to newly seeded areas. Successfully tested for air installations, logging roads, school grounds, athletic fields, temporary roads, driveways, parking lots, utility yards, and recreational camps. Found effective as a dust-proofing agent for coal and ores.

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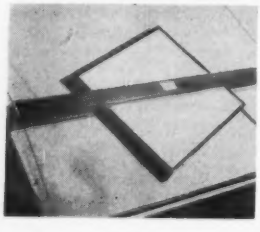
THIN TRACING TABLE — Item 5



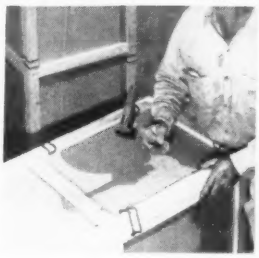
A modern, extra-thin tracing table designed specifically for use by engineers and designers is manufactured by Porta-Trace, Inc. It's lightweight, portable, easy to store; yet strong enough to permit tracing on Bristol board. Only 1 7/16 inches thick. Can be used easily under a string straight edge. Flush Plexiglas top provides for light diffusion with minimum glare; flourescent lighting gives high light output with minimum heat. Rubber feet keep it stationary.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

REUSEABLE PACKAGING CLAMP — Item 6

A new clamp has been invented by North American Aviation engineers to replace nails in fastening together cleated panel boxes. Named the Klimp, the device is an L-shaped clamp of spring steel that can be used over and over again. Said to have 30 times the holding power of a nail. Does not damage wood. Permits use of containers many times over. Saves time and labor in crating and uncrating.



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ROOFING AND SIDING MATERIAL — Item 7

The development of a special new thin-coat porcelain enamel roofing and siding material has been announced by the Toledo Porcelain Enamel Products Company, a member of the Bettinger Corporation Family of Companies. Designated Special V-Corr, the new roofing and siding material is especially designed for use in industrial areas where fumes and chemicals result in deterioration of uncoated building materials. Requires no painting. Made in a permanent blue-black finish. Extensive field testing has shown complete weather resistance. Can be cut with a power saw and can be nailed, making it useful as a field fabricated material.

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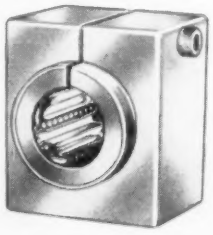
ADJUSTABLE DIAMETER LINEAR BEARING — Item 8

A new type ball bearing for linear motion is known as Adjustable Diameter Ball Bushings. The bearings are split longitudinally as illustrated and are designed to easily provide line-to-line or slight preload fits when mounted in an adjustable diameter housing. Permits the tolerance on both the shaft diameter and bearing bore to be adjusted out. Provides for compensation for wear that might eventually develop in severe applications. Can be used in a housing that is merely split and provided with an adjusting screw.



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SIX KITS FOR MAGNETIC STARTERS — Item 9

Six new kits for on-the-spot modification of General Electric magnetic starters are now available from the General Purpose Control Department. Built for across-the-line non-reversing, combination, or reversing starters, the six kits are designed so that modification can be made in a matter of minutes using only a screw-driver. The standard General Electric magnetic starter may be modified to fit any of six special conditions by installing a push button or selector switch in the starter cover, changing fuse clips on the disconnect switch, changing the coil, adding a third overload relay, or adding an auxiliary interlock kit.

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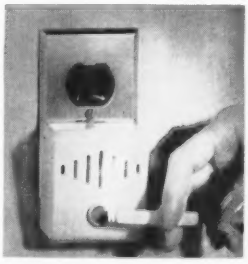
TINY FIRE ALARM — Item 10

A tiny new fire alarm that is installed by plugging into any standard AC outlet shrieks an ear-splitting alarm at the first sign of fire or ominous overheating. Portable, reusable. Draws no current except when signaling. Thermostat triggers alarm when heat reaches 140 degrees, and continues it until conditions return to normal—about 100 degrees. Can be tested by holding a lighted cigarette or match to the circular thermostat button.



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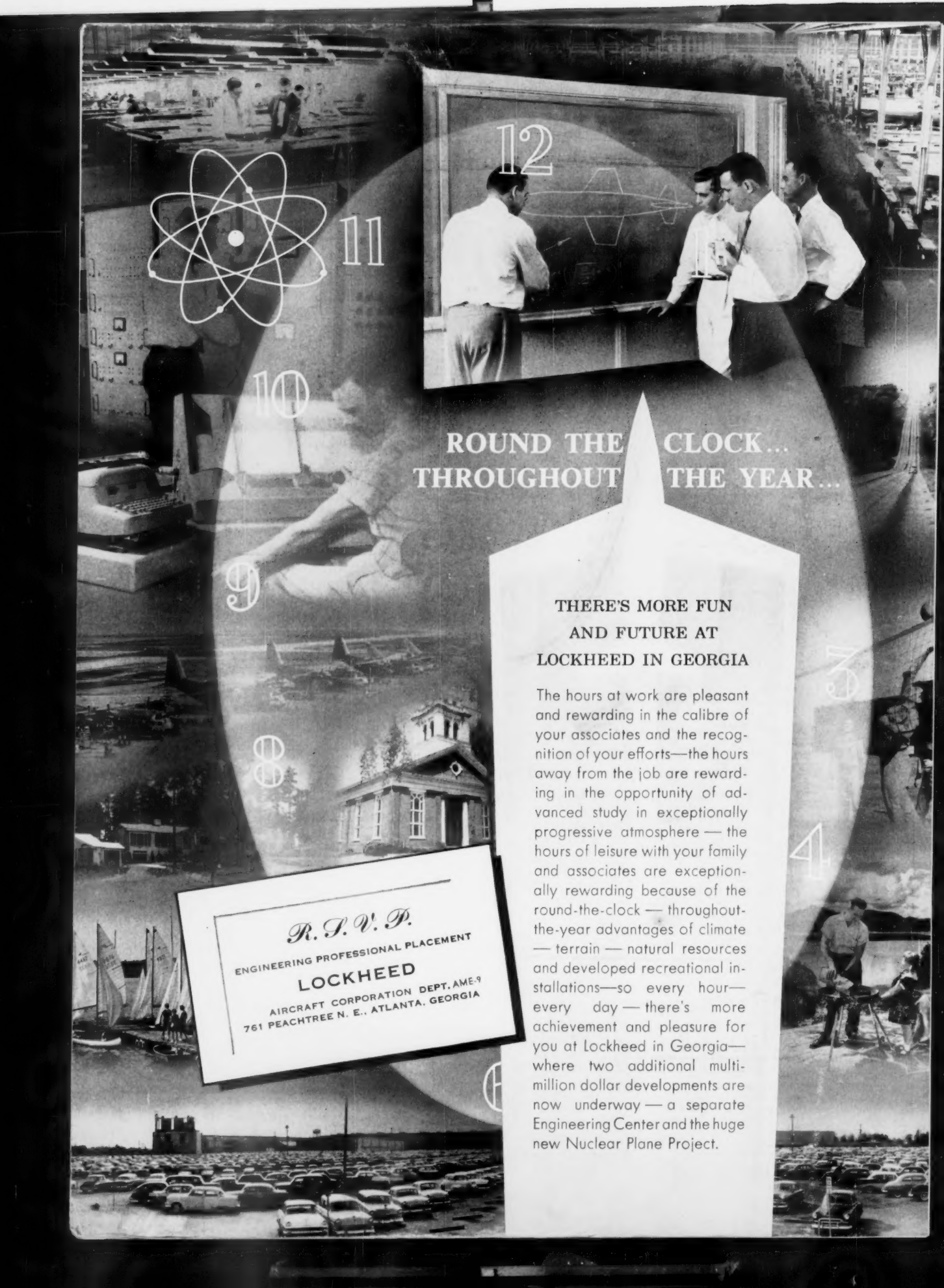
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